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ON SOME NEW AND LITTLE KNOWN DIATOMS

BY

P. T. CLEVE.

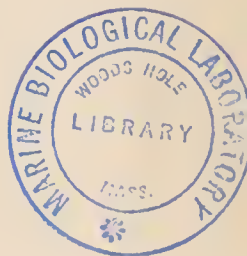
WITH SIX PLATES.

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Several years ago I received through Professor S. LOVÉN from the Swedish State Museum some samples of shellsand and mud, which had been collected during the expedition of the Roy. Swedish Frigate *Eugenie* 1851—53 on the Gallapagos Islands, Honolulu, Port Jackson etc. On examining these samples, as well as many others, received from various friends and correspondents, I found a number of diatoms, which seems to me to be entirely new to science or at least of interest. Especially am I indebted to Dr. SÖDERLUND for some very rich materials from the Mediterranean Sea and the Balearic Islets, to Mr. CHRISTIAN FEBIGER, the wellknown diatomist of Wilmington, Delaware, Mr. HAUCK of Triest, Prof. BERGGREN, Dr. O. NORDSTEDT and others for various interesting gatherings. Mr. GRUNOW of Vienna has kindly helped me in preparing this paper and assisted me in many cases of uncertainty, and for which I here take the liberty of tendering him my best thanks.

Mastogloia THWAITES.

1. *M. panduriformis* CL. N. Sp.

Valve panduriform with cuneate ends. Margin with somewhat distant loculi, except in the middle, on both sides of the central nodule, where they are wanting or indiscernible. The surface of the valve is covered with small, irregularly scattered puncta and very fine (20 in 0,01 mm.), parallel, punctate striae. These striae, which are not strongly marked, cover the whole valve, except a small area, round the straight median line and central nodule. Terminal nodules turned in opposite directions.

Length 0,0975 mm. Breadth 0,027 mm. at the constriction 0,0195 mm.

Gallapagos Islands (Eugenie Exp.) Very rare.

Pl. I, fig. 1, ⁵⁰⁰/₁.

The outline of the frustule, the few and large loculi as well as its peculiar structure distinguishes this fine form from all previously known species. Its nearest allies are the Naviculæ or Mastogloia, forming A. SCHMIDT'S section Pseudodiploneis, *N. marginata* LEWIS, *N. strangulata* GREV., *Mastogl.? reticulata* GRUN.

2. *Mastogloia submarginata* CL. et GRUN. N. Sp.

Elliptic lanceolate, ends neither produced nor capitate. Marginal loculi very indistinct, 5—8 in 0,01 mm. Striæ punctate, 18—20 in 0,01 mm., most strongly marked near the margin and on both sides of the median line, so that they seem to be interrupted by a more or less large lunate area. The striæ continue across this area, but are very faintly marked, and can only be discovered with good objectives.

Length 0,04—0,048 mm. Breadth 0,013—0,017 mm.

Gallapagos Islands (Eugenie Exp.), Campêche Bay (accord. to GRUNOW).

Pl. I, fig. 2, $\frac{1000}{1}$.

The specimens from Gallapagos Islands have 18 striæ and 8 canaliculi in 0,01 mm., specimens from Campêche Bay, according to GRUNOW, 20 striæ and 5—7 canaliculi. In its very indistinct canaliculi and the interrupted striæ this species comes nearest to *N. Jelineckii* GRUN.

Amphora EHB.1. *A. Berggrenii* CL. N. Sp.

Median band not complex, central nodule not transversely dilated. The frustule is elongated with broad and rounded ends and almost parallel sides; its form being like that of *A. arenaria* DONK. The valve is striate, dorsal striæ almost parallel, more distant in the middle (17 in 0,01 mm.) than near the ends (20 in 0,01 mm.); ventral striæ irregular, divergent, especially near the terminal nodules. Terminal nodules conspicuous and seem to project into the frustule.

Length of the frustule 0,065 mm. Breadth 0,025 mm.

Fossil, Arthurs Pass, New Zealand, mixed with freshwater species, such as *Navicula serians*, *N. rhomboides*, *N. cuspidata* etc. S. BERGGREN.

Pl. I, fig. 3, $\frac{1000}{1}$; *a.* valve, *b.* frustle.

A freshwater species of Amphora having this appearance is very remarkable. I have issued this species in CL. et MÖLL. Diat. N:o 90.

Cymbella AG.1. *Cymbella Brasiliana* CL. N. Sp.

Almost symmetrical, naviculoid (a faint obliquity being perceptible only on large specimens), lanceolate with somewhat obtuse apices. Median line straight. Striæ radiant, near the apices almost parallel, covering the whole surface, except a narrow (larger near the central nodule), area round the median line. The central striæ are stronger and more marked than the others. All the striæ are punctate, the puncta forming wavy longitudinal lines. Striæ 22 in 0,01 mm. on the part between the middle and the ends.

Length 0,035–0,06 mm. Breadth 0,012–0,015 mm.

Pl. I, fig. 4, *a.* (dry), *b.* (balsam); $\frac{1000}{1}$.

Brazil, fresh water, collected by Dr. WARMING. (CL. et MÖLL. Diat. N:o 193.)

In the strongly marked central striae this form reminds one of *Navicula Crucicula*, but it is quite different. There is also some resemblance to the *Navicula Lundströmi* CL. (in CL. et GRUN. Arctische Diat. Pl. III, fig. 39). Another allied form is the as yet undescribed *Cymbella Frieseana* GRUN. from Tana Elf in Finmarken (CL. et MÖLL. Diat. N:o 261). This species has produced and capitate ends and 12–15 punctate striae in the middle, 18–19 halfway between the middle and the ends, where they are 21 in 0,01 mm. Length 0,05–0,06 mm. Breadth 0,014 mm.

2. *Cymbella Stodderi* CL. N. Sp.

Elongate, lanceolate, slightly asymmetrical. Ends slightly produced and attenuated. Striae strongly radiant in the middle, almost parallel near the apices, scarcely punctate, 10 in 0,01 mm. a little more distant in the centre, covering $\frac{2}{3}$ of the valve and leaving on both sides of the median line a tolerably broad area.

Length 0,075–0,09 mm. Breadth 0,015 mm.

Pl. I, fig. 5; $\frac{1000}{1}$ (Specimen from Brazil).

Fossil: Bemis Lake in White Mountains (Mr. STODDER). Living: Brazil, Minas Geraes on *Sphagna* leg. Dr. HJ. MOSÉN.

This species, which occurs in CL. et MÖLL. Diat. N:o 212 and N:o 274, is most nearly related to the *C. Americana* A. SCHM. Atl. Pl. IX, fig. 15 and 20, but the latter form has a more narrow area and, as fig. 15 shows, punctate striae.

Pleurosigma W. SM.

1. *Pleurosigma tortuosum* CL. N. Sp.

Median line strongly and equally sigmoid. Striae in three sets, oblique 21, transverse 22 in 0,01 mm.

Length 0,076 mm. Breadth 0,008 mm.

Pl. I, fig. 6; $\frac{1000}{1}$.

Balearic Islets (Dr. SÖDERLUND) rare.

2. *Pleurosigma lanceolatum* var. *cuspidatum* CL.

Lanceolate with produced apices, symmetrical. Median line straight, the ends turned in opposite directions. Striae in three sets, one transverse (20 in 0,01 mm.) and two oblique (22 in 0,01 mm.).

Length 0,083 mm. Breadth 0,02 mm.

Pl. I, fig. 7; $\frac{1000}{1}$. *b.* structure; $\frac{2000}{1}$.

Marine: Port Jackson (Eugenic Exp.).

The same variety from Newcastle has according to GRUNOW 20 transverse and 19 oblique striae in 0,01 mm. Length 0,105 mm. Breadth 0,026 mm.

3. *Pleurosigma* (*Donkinia*?) *longissimum* CL. N. Sp.

Very long and narrow, linear; ends obtuse. Median line straight in the middle but curved in the last third part from the central nodule. Striæ in two sets crossing each other in right angles, transverse $18\frac{1}{2}$, longitudinal 21 in 0,01 mm. Colour pale straw.

Length of the frustule 0,17 mm. Breadth 0,0083 mm.

Pl. I, fig. 8. *a.* $\frac{600}{1}$; *b.* structure $\frac{2000}{1}$.

Balearie Islets rare (leg. Dr. SÖDERLUND).

Rhoicosigma GRUN.1. *Rhoicosigma mediterraneum* CL. (in GRUN. Micr. Journ. 1877, p. 182).

Narrow lanceolate, with acute ends. Median line strongly bent in the first third part from the central nodule, afterwards straight. Striæ longitudinal and transverse. The longitudinal striæ are very fine, about 27 in 0,01 mm., the transverse $18\frac{1}{2}$ in 0,01 mm.

Length 0,18—0,21 mm. Breadth 0,0225 mm.

Pl. I, fig. 9, $\frac{511}{1}$. *a.* and *b.* valves, *c.* structure $\frac{2000}{1}$.

Balearie Islets rare (leg. Dr. SÖDERLUND).

Navicula BORY.1. *Navicula* (*Fluminensis* var.?) *Floridana* CL. N. Sp.

Elongated, slightly constricted in the middle, ends rounded. Striæ not distinctly punctate, parallel, 15 in 0,01 mm., closer near the ends, 20 in 0,01 mm., absent from the middle part of the valve, not reaching the median line, which is surrounded by a narrow, linear area.

Length 0,045—0,075 mm. Breadth 0,01—0,012 mm. at the constriction 0,08—0,009 mm.

Pl. I, fig. 10, $\frac{1000}{1}$.

Florida coast, near Pensacola Harbour (in a gathering sent by Mr. FEBIGER).

2. *Navicula cruciata* CL. N. Sp.

Oblong, slightly contracted at the centre. Striæ 12 in 0,01 mm., parallel, costate, smooth or indistinctly granulate, absent from the middle part of the valve, not reaching the median line.

Length 0,087 mm. Breadth 0,017 mm. at the middle 0,014 mm.

Pl. I, Fig. 11, $\frac{1000}{1}$.

I have found this species in a sample, said to be from Greenland, but as it contained many tropical forms, I am not sure that this is correct.

3. *Navicula Grænlandica* CL. N. Sp.

Lanceolate with obtuse apices. Striæ coarse, costate, very radiant and divergent, crowded around the centre of the valve ($7\frac{1}{2}$ in 0,01 mm.) more distant between the centre and the ends (6 in 0,01 mm.), interrupted by furrows, parallel to the margins. Around the central nodule there is a very large orbicular area.

Length 0,117 mm. Breadth 0,023 mm.

Pl. I, fig. 13, $^{1000}/_1$.

Greenland, Davis Strait (very rare in CL. et MÖLL. Diat. N:o 172).

In its characters this species approaches *N. Trevelyana*, but its form is entirely different. The striæ are also more distant, being in *N. Trevelyana* 10 in 0,01 mm. The terminal nodules of *N. Grænlandia* are peculiar and resemble those of *N. Regula* CL. et GRUN. (CL. W. Ind. Diat. p. 5, Pl. 1, fig. 3.)

4. *Navicula Eugeniæ* CL. N. Sp.

Valve very convex, linear, with rounded ends. Striæ coarse, costate, radiant, 9 in 0,01 mm., reaching the median line, interrupted by a line parallel to the margin. Median line undulate. Central nodule surrounded by a small area. Terminal nodules elongated. — F. V. Frustule constricted in the middle; ends truncate.

Length 0,085—0,1 mm. Breadth 0,017 mm.

Pl. II, fig. 16, $^{1000}/_1$, a. S. V., b. F. V.

Gallapagos Islands (Eugenie Exp.).

5. *Navicula Hennedyi* var. *undulata* CL.

Oval with cunate ends and three undulations on each side. Striæ distinctly punctate, marginal and around the median line. The striæ near the median line are 16 in 0,01 mm. as are also the marginal striæ, except in the constrictions between the undulations, where they are only 12 in 0,01 mm.

Length 0,07 mm. Breadth 0,035 mm.

Pl. II, fig. 19, $^{1000}/_1$.

Gallapagos Islands (Eugenie Exp.).

This variety has finer striæ than the other forms of the most variable *N. Hennedyi*; the outline is also different.

N. Hennedyi var. *minuta* CL.

Broadly oval, with the marginal punctate striæ (7—8 in 0,01 mm.) separated from each other by unusually large spaces. Central striæ 9—10 in 0,01 mm.

Length 0,05 mm. Breadth 0,027 mm.

Pl. I, fig. 15, $^{1000}/_1$.

Gallapagos Islands (Eugenie Exp.).

N. Henedyi var. *Tahitensis* CL.

Broadly oval with almost parallel sides. Striæ scarcely punctate, marginal 13 in 0,01 mm., central 15 in 0,01 mm.

Length 0,05 mm. Breadth 0,023 mm.

Pl. I, fig. 14, ¹⁰⁰⁰/₁.

Tahiti (Eugenie Exp.).

This variety is remarkable for its almost smooth striæ.

6. *Navicula rudis* CL. N. Sp.

Broadly oval, with broadly rounded ends. Striæ coarse, 6 in 0,01 mm. marginal composed of about 5—8 large, separate puncta; central striæ composed of 2—3 puncta.

Length 0,052 mm. Breadth 0,032 mm.

Pl. II, fig. 17, ¹⁰⁰⁰/₁.

Balcaric Islets rare (leg. Dr. SÖDERLUND).

This peculiar form belongs evidently to the *Nav. Lyra* section. It approaches in some respects *N. spectabilis* GREG. and *N. prætecta* EHR., but it differs of both.

The numerous forms, belonging to this section, are so closely allied, that it is impossible to decide what are species or what varieties. Another most beautiful and gigantic form of this section is the following:

7. *Navicula (excavata* GREV. var.?) *Angelorum* CL.

Very large, broadly oval, with rounded ends. Area large bilobate. Striæ punctate, radiant, $6\frac{1}{2}$ in 0,01 mm. (8 near the ends). Central striæ $11\frac{1}{2}$ in 0,01 mm.

Length 0,22 mm. Breadth 0,12 mm.

Pl. II, fig. 20, ⁶⁰⁰/₁.

Fossil: California, Sancta Monica los Angeles (comm. by Dr. G. EISEN).

8. *Navicula Holmiensis* CL.

Valve large, oblong elliptic, with rounded ends. Striæ slightly radiant, $12\frac{1}{2}$ in 0,01 mm., indistinctly punctate, covering a little more than half the valve and leaving round the median line an irregular area.

Length 0,07—01 mm. Breadth in 0,023 mm.

Pl. II, fig. 18, ¹⁰⁰⁰/₁.

Slightly brackish water near Waxholm (entrance to Stockholm) leg. LAGERSTEDT and O. NORDSTEDT.

This form agrees in general appearance with *N. latiuscula* Kütz. (*N. patula* W. SM.), but has more distant striæ, which in *N. latiuscula* are 18 in 0,01 mm. and parallel.

9. *Navicula Platessa* CL. N. Sp.

Small, broadly elliptic, with mucronate apices. Striæ strong, smooth, 8 in 0,01 mm., marginal, leaving around the median line a very large area.

Length 0,028 mm. Breadth 0,018 mm.

Pl. I, fig. 12, ¹⁰⁰⁰/₁.

Gallapagos Islands rare (Eugenie Exp.).

This little *Navicula* belong to the *Palpebralis*-group, but differs from all described forms of that section by its short, distant and coarse striæ.

10. *Navicula Hauckii* CL. N. Sp.

Very long and slender, linear, somewhat gibbous in the middle and near the ends, convex. Striæ punctate, 15 in the middle of the valve, 16 towards the ends and 18 in 0,01 mm. in the ends, a little shortened around the central nodule and not reaching the median line, which is surrounded by a linear area. The striæ are interrupted by a very fine line parallel with the margin.

Length 0,128 mm. Breadth 0,012 mm.

Pl. II, fig. 27, ⁹⁰⁰/₁.

Adriatic Sea, Rovigno, stomachs of Holothurians. leg. F. HAUCK (rare in CL. et MÖLL. Diat. N:o 208—210).

This species seems to belong to the section *Nav. limosæ* and is allied to *N. maxima*, *N. formosa* etc.

11. *Navicula Febigerii* CL. N. Sp.

Lanceolate, with produced, obtuse ends. Striæ 16 in 0,01 mm., composed of distinct puncta, reaching the median line. In the middle they are alternately longer and shorter around the central nodule, which is surrounded by a broad area.

Length 0,054 mm. Breadth 0,02 mm.

Pl. II, fig. 21, ¹⁰⁰⁰/₁.

Oakland Bridge, California in a sample sent by Mr. CHR. FEBIGER.

This beautiful little species has some resemblance to *Achnanthes Danica* (FLÖGEL) GRUN., but seems to be a true *Navicula*, belonging to the section »punctatæ».

12. *Navicula Cluthensis* var.? *maculifera* CL.

Broadly oval, with rounded ends. Striæ radiant, reaching the median line, abbreviated around the central nodule, which is surrounded by a tolerably large area. Number of striæ, (which are composed of distinct puncta), 11—12 in 0,01 mm.

Length 0,05 mm. Breadth 0,026 mm.

Pl. II, fig. 23, ¹⁰⁰⁰/₁.

Slightly brackish water, near Waxholm, entrance to Stockholm (Mr. LAGERSTEDT).

This form has closer striæ than the typical species and an area around the nodule. Another smaller form is probably.

N. Cluthensis var. *minuta* CL.

Broadly oval, with rounded ends. Striæ slightly radiant, composed of distinct puncta, abbreviate around the central nodule, 15 in 0,01 mm. in the middle, 18 in 0,01 mm. in the ends.

Length 0,03 mm. Breadth 0,014 mm.

Pl. II, fig. 22, $\frac{1000}{1}$.

Florida, Pensacola in a gathering, sent by Mr. CHR. FEBIGER.

The following varieties of *N. Cluthensis* are described:

a. genuina (GREG. Diat. of Clyde p. 6, Pl. I, fig. 2) with 8 striæ in 0,01 mm and no area. Length 0,035—0,04 mm.

b. erythræa (*N. erythræa* GRUN. Verh. 1860 p. 539, Pl. III, fig. 17) with 10—12 striæ in 0,01 mm. and no area. Length 0,05—0,06 mm.

c. Finmarchica GRUN. (in CL. et GRUN. Arct. Diat. p. 40, Pl. II, fig. 49) with 11—12 striæ in 0,01 mm. and very small area. Length 0,022—0,024 mm.

d. maculifera CL. with 11 striæ in 0,01 mm. and tolerably large area.

e. minuta CL. with 15—18 striæ in 0,01 mm. and tolerably large area.

13. *Navicula bicuspidata* CL. et GRUN.

Oblong, slightly constricted in the middle, apiculate. Striæ coarse, finely punctate, 6 in 0,01 mm., shortened around the middle.

Length 0,04 mm. Breadth 0,015 mm.

Pl. II, fig. 25, $\frac{1000}{1}$.

Mediterranean, Pithuisian Islands in a gathering sent by Prof. V. B. WITTROCK.

The nearest allied to this species seems to be *Nav. directa* SM. The *Nav. salva* A. SCHM. and *Nav. opima* GRUN. have the terminal nodules at some distance from the apices.

14. *Navicula mesoleia* CL. N. Sp.

Very convex, linear with cuneate ends. Striæ coarse, 15 in 0,01 mm., very slightly radiant, almost reaching the median line, absent from the middle of the valve, where there is a transverse blank space.

Length 0,04—0,06 mm. Breadth 0,005—0,008 mm.

Pl. II, fig. 26 *a* and *b*, $\frac{1000}{1}$.

Fresh water, Brazil, leg Dr. WARMING. (CL. et MÖLL. Diat. No 193.)

This form has the appearance of some smaller varieties of *N. Pinnularia* CL. (CL. et GRUN. Arct. Diat. p. 27) but is more convex and has closer striæ.

15. *Navicula Fromenteræ* CL. N. Sp.

Small, elliptic. Striæ coarse, costate, 6 in 0,01 mm., reaching the median line, but abbreviated around the nodule.

Length 0,0375 mm. Breadth 0,0128 mm.

Pl. II, fig. 24, $\frac{1000}{1}$.

Balearic Islets (F. SÖDERLUND).

This small species seems to be the unnamed form in A. SCHMIDTS Atlas Pl. 46, fig. 7 and is perhaps according to GRUNOW the *N. mediterranea* KÜTZ. Bac. Pl. III, fig. XVII, which however is represented on much too small a scale to admit of identification. Another allied form is the yet unpublished *N. cotiformis* GRUN. from Demerara River, which has cuneate ends and 5 striae in 0,01 mm. Length 0,06 mm. Breadth 0,014 mm.

16. *Navicula Anderssonii* CL. N. Sp.

Linear oblong, with almost cuneate ends. Striae parallel or slightly radiate in the middle, $6\frac{1}{2}$ —7 in 0,01 mm. not reaching the median line, which is surrounded by a narrow area, dilated around the central nodule.

Length 0,075 mm. Breadth 0,019 mm.

Pl. III, fig. 28, $\frac{1000}{1}$.

Gallapagos Islands (Eugenie Exp.).

I have named this species in honour of the late Prof. N. J. ANDERSSON, botanist to the Eugenie Expedition.

17. *Navicula marginulata* CL. N. Sp.

Rhombic; striae very short, marginal, enclosing a large structureless area, 17 in 0,01 mm.

Length 0,042 mm. Breadth 0,012 mm.

Pl. III, fig. 29, $\frac{1000}{1}$.

Florida, near the Harbour of Pensacola, in a gathering sent by Mr. FEBIGER.

18. *Navicula (Powellii* LEWIS var.) *Gallapagensis* CL.

Linear oblong with cuneate ends. Striae coarse, almost parallel, $8\frac{1}{2}$ in 0,01 mm., on both side of the median line interrupted by linear areas. There are thus four longitudinal series of short striae, two near the margins and two close to the median line, interrupted near the central nodule.

Length 0,05—0,09 mm. Breadth 0,013—0,021 mm.

Gallapagos Islands (Eugenie Exp.).

Pl. III. fig. 30.

Of the true *N. Powellii* LEWIS I have not seen a figure, but GRUNOW states that his *N. Vidowichii* (Verh. 1863, Pl. IV, fig. 4) is the same species. I have seen the latter form in gatherings from Adriatic sea, kindly sent me by Mr. F. HAUCK, and I find that the form is different, the striae more distant (6 in 0,01 mm.). Length 0,1122 mm. Breadth 0,02 mm. *N. Egyptiaca* GREV. Trans. Micr. Journ. XIV, p. 127, Pl. 12, fig. 16—17 seems to be the same, but the striae are stated to be only 4 in 0,01 mm. Another allied form is, as far as may judge from the figure, *N. Zanardiniana* GRUN. (Verh. 1860, Pl. 3, fig. 12) with indistinctly punctate striae, 6 in 0,01 mm., in four uninterrupted rows. Another, undescribed form is *N. Wittii* GRUN. Mspt. (Pl. III, fig. 31, $\frac{900}{1}$) from Brazil, which is not so long and slender as the last named species and has 8 striae in 0,01 mm. The two following forms are also allied to *N. Powellii*.

19. *Navicula amica* CL. et GRUN.

Contracted in the middle, ends euneate; striae $7\frac{1}{2}$ in 0,01 mm., almost parallel, smooth. The two interior rows of striae are interrupted in the middle.

Length 0,075 mm. Breadth 0,023 mm.

Pl. III, fig. 37, ⁹⁵⁰/₁.

Tahiti (Eugenie Exp.).

20. *Navicula quadriseriata* CL. et GRUN.

Large, oblong oval with parallel sides and euneate ends. Striae smooth, 8 in 0,01 mm. in four longitudinal, uninterrupted rows. The interior striae are shortened around the central nodule, which is surrounded by an orbicular area.

Length 0,09 mm. Breadth 0,035 mm.

Pl. III, fig. 32, ⁶⁰⁰/₁.

Balearie Islets very rare (F. SÖDERLUND).

Two other species, of which Mr. GRUNOW has sent me figures, seem to be related to the last described forms: *N. Castracanei* GRUN. (Pl. III, fig. 33, ⁹⁰⁰/₁) and *N. Petitiana* GRUN. (Pl. III, fig. 34, ⁹⁰⁰/₁). Both species are elliptic lanceolate and have the interior rows of striae parallel with the margins of the valve, not close to the median line. *N. Castracanei* is 0,1 mm. in length, 0,03 mm. in breadth, and has 9 striae in 0,01 mm. *N. Petitiana* is 0,07 mm. in length and 0,02 mm. in breadth and has 11 striae in 0,01 mm.

All these species together with the following seem to form a section, for which Mr. GRUNOW has proposed (CL. et GRUN. Art. Diat. pag. 29), the name *quadri-seriatæ*:

This group contains:

Navicula Powellii LEWIS = *N. Vidowiehii* GRUN.

N. Egyptiaca GREV.

N. (Powellii var.) *Gallapagensis* CL.

N. Zanardiniana GRUN.

N. Wittii GRUN.

N. amica CL. et GRUN.

N. quadriseriata CL. et GRUN.

N. Castracanei GRUN.

N. Petitiana GRUN.

? *N. (Stauroneis) robusta* PETIT (Diat. de l'île Campbell Pl. V, fig. 16).

N. biseriata PETIT (l. c. Pl. IV, fig. 15).

N. Richardsoniana O'MEARA (Irish Diat. Pl. 31, fig. 33).

N. Eugenie CL. (this paper pag. 7).

? *N. denticulata* O'MEARA (Quart. J. M. S. VII, p. 115, Pl. V, fig. 2, 1867).

? *N. Musca* EHB.

? *N. mirabilis* LEUDUGER FORTMOREL (Diat. de Ceylon Pl. II, fig. 21).

N. blanda A. SCHM. (Nordsee Diat. Pl. II, fig. 27).

N. latifasciata GRUN. (in CL. et GRUN. Arct. Diat. Pl. I, fig. 21).

N. subdivisa GRUN. (Nordsee Diat. fig. 20).

N. consimilis A. SCHM. (l. c. p. 46).

N. æmula GRUN. (in A. SCHM. Nordsee Diat. II, fig. 47).

N. superimposita A. SCHM. (Nordsee Diat. II, fig. 34 and Diat. Atl. Pl. 46, fig. 61).

To these species are two undescribed forms nearly allied: *N. Bruchii* GRUN. and *N. multiseriata* GRUN.

N. Bruchii GRUN. (Pl. III. fig. 35, $\frac{900}{1}$) found on Tahiti, is in length 0,04 mm. and in breadth 0,012 mm.

N. multiseriata GRUN. (Pl. III, fig. 36, $\frac{900}{1}$) from Tongatabu, is in length 0,036.

Navicula. Section: Pseudo-amphiprora CL.

I propose to include in this section a small number of Navicula-forms, which are in some respects akin to Amphiprora and in other to Stauroneis. The valve on both sides in the median line is divided by a keel into two portions. The central nodule is transversely dilated into a short stauros, reaching the above named keels. The type of the section is:

Navicula arctica CL.

In my paper On the arctic Diat. (Bih. till K. Sv. Vet. Ak. Handl. 1873, 1, N:o 13, p. 16, Pl. III, fig. 13).

This fine species was first described and somewhat indifferently figured by BAILAY (SMITHS. Contr. Vol. VII, p. 8. fig. 14 and 15, 1853) as *Amphora stauroptera*. GREGORY afterwards gave (in his Diat. of Clyde 1857, p. 34, Pl. IV, fig. 59 c.) a very fine figure of the species in question in S. V., but he regards it as *Amphiprora lepidoptera*. At the same time he describes the F. V. as *Amph. obtusa* (fig. 60 l. c.). but Mr. LAGERSTEDT (Bih. till K. Sv. Vet. Ak. Handl. T. III, N:o 15, p. 46) has found that the two figures (59 and 60) belong to the same species. As the names *N. stauroptera* and *N. obtusa* have been used for other forms it will be most convenient to name the species *N. arctica*. A. SCHMIDT has figured the species in his Nordsee Diat. Pl. III, fig. 1 as *Amphiprora obtusa* GREG. If the *Nav. arctica* O'MEARA (Micr. Journ. Vol. XIV, Pl. VIII, fig. 1) belongs to this species I don't know.

The *Nav. arctica* lives in the northern part of the Atlantic. It has been issued in CL. et MÖLL. Diat. N:o 57.

21. *Navicula jugata* CL.

Elegantly elliptic with parallel, indistinct, and punctate striæ, 10 in 0,01 mm., between the keels and the margins. The median portion of the valve, between the keels, seems in very oblique light and with good objectives to be exceedingly finely striate.

Length 0,093 mm. Breadth 0,024 mm.

Pl. III, fig. 38, ⁹⁰⁰/₁.

Gallapagos Islands rare (Eugenic Exp.).

GRUNOW has found in the Campeche Bay gathering a closely allied form, *Amphiprora Campechiana* GRUN. (Arct. Diat. pag. 66), which has $12\frac{1}{2}$ striæ in 0,01 mm. and another species with 15 striæ in 0,01 mm. and obtuse ends.

22. *Navicula Pensacolæ* CL. N. Sp.

Lanceolate, with undulate margins and prominent apices. Striæ indistinct, punctate, 15 in 0,01 mm., parallel. The portion of the valve between the keels is very indistinctly striate.

Length 0,054 mm. Breadth 0,015 mm.

Pl. III, fig. 39, ¹⁰⁰⁰/₁.

Florida near the Harbour of Pensacola in a gathering sent by Mr. FEBIGER.

The following species is perhaps related to the species of this section:

23. *Navicula Gallapagensis* CL. N. Sp.

Panduriform, with cuneate ends. Striæ transverse, parallel, 15 in 0,01 mm., indistinctly punctate, reaching the median line and interrupted by a line or keel. The median part of the valve around the median line is striate.

Length 0,067—0,092 mm. Breadth 0,025 mm.

Pl. III, fig. 40, ⁸⁵⁰/₁ a. S. V. b. F. V.

Gallapagos Islands rare (Eugenic Exp.).

Stauroneis EHB.

1. *Stauroneis Balearica* CL. N. Sp.

Elongated, with acute ends. Stauros very short. Striæ transverse, 26 in 0,01 mm., and longitudinal 23 in 0,01 mm., crossing each other in right angles.

Length 0,11 mm. Breadth 0,013 mm.

Pl. III, fig. 41, a. ⁶⁰⁰/₁, b. structure ²⁰⁰⁰/₁.

Balearic Islets rare (F. SÖDERLUND).

This species is nearly akin to *St. Quarnerensis* (GRUN. in litt.) from the Adriatic Sea, which has also a short stauros and 18 longitudinal striæ in 0,01 mm.

2. *Stauroneis sulcata* CL. N. Sp.

Linear, with cuneate ends, stauros reaching the margin. Structure: strong, longitudinal lines or furrows, parallel with the median line, and transverse parallel striæ, 21 in 0,01 mm.

Length 0,088—0,109 mm. Breadth 0,008—0,009 mm.

Pl. III, fig. 46, $\frac{1000}{1}$.

Balearic Islets rare (F. SÖDERLUND).

Among the *Stauroneis* forms, known to me, there are two, which have a similar structure: *St. Stodderi* LEWIS and *St. Stodderi* var. *insignis* GRUN., both freshwater species. *St. sulcata* is marine and has finer striae.

3. *Stauroneis Africana* CL. N. Sp.

Valve very convex, hyaline, elongate. Stauros reaching the margins. Striae fine, 23 in 0,01 mm., parallel, reaching the median line.

Length 0,05 mm. Breadth 0,01 mm.

Pl. III, fig. 42, $\frac{1000}{1}$, a. F. V., b. S. V.

Fresh, or very slightly brackish water, Zwathrops River, Port Elisabeth, South Africa in a sample sent by Mr. W. JOSHUA (CL. and MÖLL. Diat. N:o 196).

This form is nearly related to *S. salina* W. SM., but has finer striae. The striae of *S. salina* are 17 in 0,01 mm.

4. *Stauroneis pachycephala* CL. N. Sp.

Linear, gibbous in the middle and at the ends, which are broadly rounded and capitate. Striae oblique, very fine, about 29 in 0,01 mm., reaching the median line. Stauros reaching the margin. Median line straight. Terminal nodules turned in opposite direction.

Length 0,055 mm. Breadth 0,009 mm.

Pl. III, fig. 43, $\frac{1000}{1}$.

Fresh or slightly brackish water, Baakens River, Port Elisabeth, South Africa in a sample sent by Mr. JOSHUA (CL. et MÖLL. N:o 197).

This species comes nearest to *St. desiderata* CL. (in CL. et GRUN. Arctische Diat. Pl. III, fig. 58), which also has the terminal nodules turned in opposite direction, but the outline of this species is different and its striae are almost parallel and much coarser. Both belong to a section parallel with GRUNOWS section *Pseudopleurosigma* of Navieula.

5. *Stauroneis (Pleurostauron) Sagitta* CL. N. Sp.

Elongated, apiculate, to the outline resembling *St. Smithii* GRUN. Ends with short interior diaphragms as in *Pleurostauron*. Striae oblique 21 in 0,01 mm. one or two in the middle very strong.

Length 0,03—0,04 mm. Breadth 0,006—0,01 mm.

Pl. III, fig. 45, $\frac{1000}{1}$.

Fresh water, mouth of Tana Elf, Finnmarken, collected by Prof. TH. M. FRIES (CL. et MÖLL. Diat. N:o 261 not rare).

This form has the appearance of *S. Smithii* GRUN., but is larger and has coarser striae (being 28 in 0,01 mm. on *S. Smithii*) not so parallel as in *S. Smithii*.

Schizostauron GRUN.

1. *Schizostauron Crucicula* GRUN.

Striae oblique, fine, 25 in 0,01 mm. Stauros bifid with very divergent branches, reaching the margins.

Length 0,03 mm. Breadth 0,009 mm.

Pl. III, fig. 44, $\frac{1000}{1}$.

Merrimac River U. St. on Chara, very rare in a gathering sent by Mr. O. NORDSTEDT.¹⁾

Nitzschia W. SM.

1. *Nitzschia ocellata* CL.

This species has already been described in CL. et GRUN. Arct. Diat. p. 80. The frustule is panduriform; the keel central with 8—10 puncta in 0,01 mm. The striae are fine, 22 in 0,01 mm. composed of small, elongate puncta. The striae are sharper and more distant in the centre of the valve. The whole valve is covered with large scattered puncta sometimes arranged in irregular, transverse lines.

Length 0,08—0,1 mm. Breadth of the frustule 0,027 mm. at the constriction 0,018 mm.

Pl. IV, fig. 47, $\frac{1000}{1}$, *a.* valve, *b.* frustule.

Balearic Islets (Dr. SÖDERLUND). CL. et MÖLL. Diat. N:o 154—155 rare.

This species is placed by GRUNOW in his section Pseudoamphiprora, very nearly to *Perrya* KITTON.

2. *Nitzschia praelonga* CL.

This species has already been described in CL. et GRUN. Arct. Diat. p. 85. The frustules are extremely long and slender, slightly arcuate, linear, with obliquely cuneate ends. Keel almost central. with about 5 puncta in 0,01 mm. The striae are strong, 16 in 0,01 mm.

Length 0,25 mm. Breadth 0,009 mm.

Pl. IV, fig. 48, *a.* $\frac{600}{1}$, *b.* $\frac{1000}{1}$.

Balearic Islets not rare (Dr. F. SÖDERLUND).

¹⁾ In printing this paper I have been informed by Mr. GRUNOW that he has found the same form abundantly in pools of the Rio Purus, Brazil, and that he has named it in *Linnean Society Journ.* of May 1880 I consequently adopt his name.

Surirella TURPIN.1. *Surirella Caldensis* CL. N. Sp.

Very long and slender, linear. with cuneate ends. Alæ high. Canaliculi short, numerous, 4—5 in 0,01 mm. Margin striate; striæ punctate 20 in 0,01 mm. F. V. linear, not cuneate.

Length 0,108 mm. Breadth 0,013 mm.

Pl. IV, fig. 50, $\frac{1000}{1}$.

Brazil. Caldas on Sphagnum (Dr. HJ. MOSEN). CL. et MÖLL. Diat. N:o 212, common.

This species comes near to *S. arcta* A. SCHM. Atl. Pl. 23, fig. 23—24 from De-merara, but its canaliculi are shorter and denser.

2. *Surirella degenerans* CL. N. Sp.

Oblong, with very broad ends and slightly contracted middle. Margins striate. Costæ obsolete, consisting only of the dilated portion. Area with some scattered markings and striæ.

Length 0,09—0,072 mm. Breadth 0,037—0,046 mm.

Pl. IV, fig. 51, $\frac{500}{1}$.

Gallapagos Islands (Eugenie Exp.).

This form, which belongs to the variable section of *S. lata*, is related to *S. laxa* JANISCH.

3. *Surirella formosa* CL. N. Sp.

Panduriform with large, rounded ends. Margin striate. Costæ abbreviate, with the dilated portion comparatively large. The middle of the valve is occupied by a narrow linear area, defined by short striæ.

Length 0,22 mm. Breadth 0,11 mm. at the constriction 0,07 mm.

Pl. IV, fig. 49, $\frac{500}{1}$.

Gallapagos Islands extremely rare (Eugenie Exp.).

This very large and beautiful *Surirella* does not agree with any of the many forms belonging to *S. lata*-section hitherto figured.

Campylodiscus EHB.1. *Campylodiscus* (*Ecclesianus* var.?) *peramplus* CL.

Very large, costæ numerous 4—5 in 0,01 mm., equal in length, marginal. Area large with a circle of puncta and with some stellate markings.

Diam. 0,12—0,16 mm.

Pl. IV, fig. 53, $\frac{600}{1}$.

Gallapagos Islands (Eugenie Exp.).

The *C. Ecclesianus* GREV. (1857) is as Mr. JANISCH correctly states the same as *C. fenestratus* GREV., which is the entire frustule. Mr. JANISCH proposed (1863) the name *C. Rabenhorstianus*, but which should be changed for the older name of GREVILLE'S. The type of this extremely variable species, especially abundant in the caribbean area, has alternating longer and shorter costæ and an area not surrounded by a circle of puncta. The form from Gallapagos Islands is therefore distinct, but, considering the great variability of the species, I am inclined to regard it only as a variety.

The stellate markings on the disc are very variable, and in some specimens wanting.

2. *Campylodiscus Margaritarum* CL. N. Sp.

Costæ numerous, covering about $\frac{2}{3}$ of the disc, interrupted by a fine line and surrounding an elongate area, where some fragmentary punctate lines are visible as the continuation of the costæ.

Diam. 0,06 mm.

Pl. IV, fig. 52, $\frac{500}{1}$.

Pearl Islands rare (Eugenie Exp.).

In its general form this species resembles *C. angularis* GREV., but is different.

Plagiogramma GREV.

1. *Plagiogramma rutilarioides* CL. N. Sp.

Small, rhombic, more or less elongate, with two converging costæ around the centre, but not near the ends. Structure: transverse punctate lines, 15 in 0,01 mm. Margin with one or two sets of larger puncta, which probably are the bases of bristles.

Length 0,03—0,0425 mm. Breadth 0,01—0,013 mm.

Pl. IV, fig. 54, $\frac{1000}{1}$.

Port Jackson, Australia (Eugenie Exp.).

2. *Plagiogramma spinosum* CL. N. Sp.

Valve narrow, constricted in the middle, then dilated, and again constricted. Costæ 2 strong, around the centre. Ends slightly capitate. Structure: puncta, arranged in regular transverse rows, 10 in 0,01 mm. and in irregular longitudinal lines. The margin of the frustule is furnished with a row of short setæ or bristles. The ends of the valves have blank (not punctate), oval areas.

Length 0,08 mm. Breadth 0,01 mm.

Pl. IV, fig. 55, $\frac{800}{1}$.

The marginal setæ are visible when the frustule lies in an oblique position.

Gallapagos Islands rare (Eugenie Exp.).

This form has the same general outline as *P. caribbæum* CL., *P. lyratum* GREV and *P. Barbadosense* GREV. It is most nearly akin to the latter, but the ends are dissimilar and the structure different.

Rutilaria GREV.1. *Rutilaria recens* CL. N. Sp.

Valve plane, elliptic or elongate with acute ends. It is covered with numerous scattered puncta, which sometimes are arranged in irregular lines. Besides these there are in the centre of the valve some more strongly marked puncta, and which seem to belong to another stratum of the valve. The margin has a row of puncta, which are, as may be seen in the F.V., short spines. In the F. V. the ends of the valve terminate in short processes.

Length 0,037—0,11 mm. Breadth 0,02 mm.

Pl. IV, fig. 57, *a.* ¹⁰⁰⁰/₁ (an abnorm specimen having no puncta on a part of the valve), *b.* ⁸⁰⁰/₁ small specimen.

Gallapagos Islands (Eugenie Exp.).

The genus *Rutilaria* established by Dr. GREVILLE, comprises only some few species, all fossil. These are *R. Epsilon* GREV., rare in Monterey stone, *R. superba* (and var.? *ventricosa*) GREV. and *R. elliptica* GREV. from Barbados. They all have the curious markings in the centre of the valve, which are elevations above the level of the frustule, as is visible on the fig. 10, Pl. XI, T. Micr. Soc. Vol. XIV. In our recent species these markings are represented only by the strongly marked puncta. From GREVILLE's fig. of the F. V. of *R. elliptica* and *R. superba* it is evident that the valve is plane and that its apices are produced into processes, and farther that the margins of the frustule are bounded with a row of setæ, exactly as in our species.

The position of *Rutilaria* is somewhat uncertain. GREVILLE has pointed out its relationship to *Nitzschia* and *Fragilaria*. Prof. HAMILTON SMITH places it among the *Melosiræ*. It has however no real affinity with *Nitzschia* or *Melosiræ*, but is very nearly allied to the genus *Cymatosira* GRUN., of which the only known species *C. Lorenziana* GRUN. has also marginal bristles. The *Cymatosira* is without doubt nearly related to *Dimerogramma*.

Mr. KITTON writes to me in a letter about a new species of *Rutilaria* from the Californian deposits, *Rut. obesum* GREV. Mpt. The valve has 3 inflations, the central being the largest; the apices are shortly cuneate; one third of the area is smooth, the remainder distinctly covered with irregular markings. The central nodule consists of a nebulous circular spot, upon which is placed a short spiral (?) ring. Margin distinctly punctate. Mr. KITTON has seen about half a dozen specimens of this species, all frustles, and in no case was he able to separate the valves. I crushing partially one specimen in balsam, he observed that the nebulous central nodule was the base of a siliceous isthmus, connecting the two valves.

Mathematical Form

1. *Mathematical Form of the Model*

The model is a linear regression model with the following form: $Y = \beta_0 + \beta_1 X + \epsilon$, where Y is the dependent variable, X is the independent variable, β_0 is the intercept, β_1 is the slope, and ϵ is the error term.

Let $\beta_0 = 10$ and $\beta_1 = 2$.

Let $X = 5$ and $Y = 20$.

Calculate the value of the error term ϵ .

Statistical Form

1. *Statistical Form of the Model*

The statistical form of the model is a linear regression model with the following form: $Y = \beta_0 + \beta_1 X + \epsilon$, where Y is the dependent variable, X is the independent variable, β_0 is the intercept, β_1 is the slope, and ϵ is the error term.

Let $\beta_0 = 10$ and $\beta_1 = 2$.

Let $X = 5$ and $Y = 20$.

Calculate the value of the error term ϵ .

The model is a linear regression model with the following form: $Y = \beta_0 + \beta_1 X + \epsilon$, where Y is the dependent variable, X is the independent variable, β_0 is the intercept, β_1 is the slope, and ϵ is the error term.

Stephanie's Form

1. *Stephanie's Form of the Model*

The model is a linear regression model with the following form: $Y = \beta_0 + \beta_1 X + \epsilon$, where Y is the dependent variable, X is the independent variable, β_0 is the intercept, β_1 is the slope, and ϵ is the error term.

Let $\beta_0 = 10$ and $\beta_1 = 2$.

Calculate the value of the error term ϵ .

Let $X = 5$ and $Y = 20$.

The model is a linear regression model with the following form: $Y = \beta_0 + \beta_1 X + \epsilon$, where Y is the dependent variable, X is the independent variable, β_0 is the intercept, β_1 is the slope, and ϵ is the error term.

Cyclotella KÜTZ.

1. *Cyclotella Meneghiniana* var.? *stelligera* CL. et GRUN.

Disc with marginal striæ, about 14 in 0,01 mm., and with a central star of radiating lines, alternately shorter and larger.

Diam. 0,022 mm.

Pl. V, fig. 63, ¹⁰⁰⁰/₁. *a.* Specim. from New Zealand; *c.* small specimen from Lac de Gerardiner (Vosgues).

New Zealand, Rotorua Lake, coll. by S. BERGGREN.

Another variety *stellulifera* GRUN. is represented by the fig. *b.* and is characterized by the granulate striæ.

Liradiscus GREV.

1. *Liradiscus* (?) *Capensis* CL. N. Sp.

Circular, with a narrow, striate margin (with 15 striæ in 0,01 mm.). Disc covered with curved and branching, but not anastomosing lines or markings, which do not form a coherent network.

Diam. 0,04 mm.

Pl. V, fig. 61, ⁷⁰⁰/₁.

Marine, Cape of Good Hope in a slide sent by Mr. F. HAUCK.

Of the genus *Liradiscus* only four species are known, all fossil from Barbados deposit. Our form, if it really belongs to *Liradiscus*, is the first known as recent. It is doubtful if it not would be better to place it in *Cyclotella*, as it has some relationship to *C. striata* KÜTZ. or *C. Dallasiana*.

Auliscus BAIL.

1. *Auliscus* (?) *insignis* CL. N. Sp.

Disc almost orbicular with 2 rounded, not truncate processes, and divided by a large cruciform blank area in to four compartments. The compartments have a very singular structure and seem to be covered with irregular depressions. In the F. V. they are elevated and the processes rounded.

Diam. 0,12 mm.

Pl. V, fig. 64, *a.* ⁵⁰⁰/₁, S. V. *b.* ³⁰⁰/₁, F. V.

Gallapagos Island extremely rare (Eugenie Exp.).

I am unacquainted with any *Auliscus* having the rounded processes of this glorious species; it should perhaps be placed in the genus *Cerataulus*.

Another remarkable species of *Auliscus* (*A. Ralfsianus* GREV.) hitherto known only in a fossil state from the Barbados Deposit, occurs in the extremely interesting Gallapagos material.

Biddulphia GRAY.1. *Biddulphia Moronensis* CL. N. Sp.

Valve in S. V. oval, stout, with two strong transverse costæ and two large and stout oval processes. Structure: large, irregularly scattered puncta on the valve and fine dots arranged in irregular lines on the processes.

Length of the valve 0,12 mm. Breadth 0,07 mm.

Pl. IV, fig. 56, ⁵⁰⁰/₁.

Moron deposit in a slide from Mr. J. D. MÖLLER.

2. *Biddulphia tentaculifera* CL. N. Sp.

Valve elevate, covered with tolerably large puncta arranged irregular lines around the centre of the valve. No costæ are visible. Processes elongate, club shaped.

Diam. of the valve 0,05 mm.

Pl. V, fig. 67, ⁸⁰⁰/₁.

Keeling Island (Eugenie Exp.).

3. *Biddulphia Gallapagensis* CL. N. Sp.

S. V. broadly oval, almost orbicular, with two short stout processes. Structure: pearly granules arranged in lines, radiating from the irregularly punctate centre to the margin, about 12—13 in 0,01 mm.

Longest diameter 0,049 mm., shortest 0,04 mm.

Pl. VI, fig. 74, ¹⁰⁰⁰/₁.

Gallapagos Islands (Eugenie Exp.).

This form belongs to the section of *B. aurita*, which contains a large number of nearly allied forms, as *B. Roperiana*, *B. Edwardii* FEBIGER etc.

Triceratium EHB.1. *Triceratium* (*Hydrosera*; *Terpsinoë*?) *trifoliatum* CL. N. Sp.

Valve plane, with concave sides and three 3-cuspidate angles, separated from the valve by transverse lines (incomplete diaphragms). Surface covered with small puncta arranged in irregular lines.

Diam. 0,045 mm. Distance between two apices 0,05—0,06 mm.

Pl. VI, fig. 71, ⁶⁰⁰/₁.

New Zealand in fresh or slightly brackish water collected by Mr. S. BERGGREN very rare.

This curious species is remarkable for its freshwater habit and seems to be most nearly related to *Hydrosera Wallich* from the Ganges, but it is entirely different.

2. *Triceratium (Hydrosera; Terpsinoë) Javanicum* CL. N. Sp.

Valve plane, hexagonal, with three angles separated from the disc by transverse lines (diaphragms) and alternating with three other angles, which are contiguous with the disc. One of the three latter angles has near the apex a small transverse fissure corresponding to the appendages on *Hydrosera triquetra* WALLICH. Structure irregular 5—7-gonal cells, 4—5 in 0,01 mm., absent from the ends of the three first named angles. F. W. Rectangular with longitudinal furrows, corresponding to the sinuses between the angles.

Diam. 0,075 mm.

Pl. VI, fig. 75, $\frac{600}{1}$.

Java, Batavia in brackish water (Eugenic Exp.).

This form is so nearly related to *Hydrosera triquetra* WALLICH Mier. Journ. VI, p. 251, Pl. 13, fig. 1—6, that it perhaps might be more correctly regarded as a mere variety.

3. *Triceratium dubium* BTW.

Mier. Journ. VII, p. 180, Pl. 9, fig. 12 is the triangular form of *T. bicornis* CL. (Bih. t. K. Sv. Vet.-Ak. Handl. Pl. 5, fig. 30).

4. *Triceratium Tripos* CL. N. Sp.

Outline in the S. V. almost orbicular or triangular with very broad and rounded angles. Processes three near the angles. Structure a somewhat coarse and irregular cellulation of hexagonal cells, about 5 in 0,01 mm. In the F. V. the valve is elevated, sloping regularly from the apex to the margins. The three processes are strong and and project somewhat obliquely.

Diam. of the valve 0,0525 mm.

Pl. VI, fig. 72, $\frac{900}{1}$.

Gallapagos Islands (Eugenic Exp.).

5. *Triceratium Anderssonii* CL. N. Sp.

This very rare and exceedingly fine species, of which I have found only one incomplete specimen, is quadrangular with straight sides and rounded angles, upon which are large truncate processes. The structure consists of branching veins, radiating from the centre to the margins, and of tolerably coarse cellules, about 5 in 0,01 mm., of which two rows fill the space between each pair of lines.

Greatest diameter 0,09 mm.

Pl. VI, fig. 69, $\frac{500}{1}$.

Gallapagos Islands (Eugenic Exp.).

The structure of this remarkable species, which I have named in honour of the late Prof. N. J. ANDERSSON, is that of a *Stictodiscus*.

6. *Triceratium lave* CL. N. Sp.

Triangular or quadratic, with straight sides and acute not produced angles. The surface perfectly smooth, no structure being visible on balsam-specimens. In F. V. the centre of the valve is elevated, and the angles are produced into processes, forming right angles with the transverse diameter.

Distance between angles 0,02—0,0285 mm.

Pl. VI, fig. 70, ⁷⁰⁰/₁, a. S. V., b. F. V.

Gallapagos Islands (Engenie Exp.).

7. *Triceratium (productum* GREV. var.) *Balearicum* CL. et GRUN. (in CL. et MÖLL. Diat. N:o 154—155).

This form is closely allied to *Amphitetras producta* GREVILLE and *Triceratium Antillarum* CL. Its outline is 4—5 angular, with the angles produced into short processes. The centre of the valve is elevated and by a depression separated from the margins. The structure consists of rounded puneta arranged in lines, radiating from the centre to the angles, about 5 in 0,01 mm.

Greatest diameter 0,06—0,08 mm.

Pl. VI, fig. 73, ⁵⁰⁰/₁.

Balearic Islets (Dr. F. SÖDERLUND).

There can be not doubt that *A. producta* GREV. (Micr. Journ. II, p. 94, Pl. 9, fig. 2) and *T. Antillarum* CL. (Bih. till K. Sv. Vet.-Ak. Handl. Bd. V, N:o 8, Pl. V, fig. 29) belong to the same species, which seems to be nearly allied also to *Amphitetras elegans* GREV. from Monterey stone, in which form the depression between the centre and the margins form an inscribed quadrate.

Allied to these forms seems to be *Am. nobilis* GREV. (Trans. Micr. Soc. 1865, p. 105, Pl. IX, fig. 27) from the Red Sea. This species is however larger and seems to be only the pentagonal form of *Am. antediluviana*. It occurs in RABENHORST, Alg. Eur. N:o 2264 from Livorno together with *Am. antediluviana*, and Mr. KITTON informs me that he has found it in samples from Orkney Islands and Southampton; he also remarks that the processes are much exaggerated in GREVILLE'S figure. Another form related to *A. antediluviana* is *A. tessellata* SHADB. (T. M. S. 1854, p. 16, Pl. 1, fig. 11), of which a variety with very coarse cellulation and large processes occurs in Moron Deposit.

The *Triceratium productum* GREV. from Barbados Deposit is a quite different form (see T. M. S. 1863, IX, p. 69, Pl. VIII, fig. 9).

8. *Triceratium Gallapagense* CL. N. Sp.

Triangular, with acute angles, not provided with processes. Structure: distant puneta, scattered over the disc of the valve, closer near the margins, where they form

short rows, 5 in 0,01 mm. In the angles the puncta are much smaller and form fine branching lines.

Distance between angles 0,0975 mm.

Pl. VI, fig. 72, $\frac{600}{1}$.

Gallapagos Islands rare (Eugenie Exp.).

9. *Triceratium margaritiferum* CL. N. Sp.

Valve quadrangular with concave sides and rounded angles, without processes. Surface probably plane. Structure tolerably coarse granules arranged near the margins in short lines, smaller in the angles, rare and scattered in the middle.

Diam. 0,05 mm.

Pl. VI, fig. 76, $\frac{600}{1}$.

Gallapagos Islands rare (Eugenie Exp.).

Chaetoceros EHB.

1. *Chaetoceros Dichæta* EHB. = *C. remotus* CL. et GRUN.

This form has already been described in CL. et GRUN. Arct. Diat. p. 119 and is to be found in most slides of CL. et MÖLL. Diat. N:o 125.

Pl. VI, fig. 77, $\frac{600}{1}$.

Antarctic Ocean (Challenger Exp.).

Rhizosolenia EHB.

1. *Rhizosolenia (alata* var.?) *gracillima* CL.

Extremely long and slender, measuring 0,5—0,7 mm. in length and only 0,006 mm. in breadth. The beaks are almost straight, provided with pocket-like impressions. The zig-zag markings on the connecting membrane are very indistinct. The frustule is extremely hyaline, having no colour in dry state. No structure has been seen.

Pl. VI, fig. 78, $\frac{1000}{1}$.

West coast of Sweeden, Lysekil, freely floating on the surface of the sea (July 1877 by P. T. CLEVE).

Another slender species, characterized by its coarse, of puncta composed striæ, *Rh. Shrubsolei* CL. N. Sp., occurs in the Atlantic Ocean between Iceland and Greenland. It was recently found in great abundance on the surface of the sea near the island of Sheppey by Mr. SHRUBSOLE.

Description of plates I—VI.

Plate I.

- Fig. 1. *Mastogloia panduriformis* CL.
» 2. *M. submarginata* CL. et GRUN.
» 3. *Amphora Berggrenii* CL.
» 4. *Cymbella Brasiliana* CL.
» 5. *C. Stodderi* CL.
» 6. *Pleurosigma tortuosum* CL.
» 7. *Pl. lauceolatum* var. *cuspidatum* CL.
» 8. *Pl. (Donkinia?) longissimum* CL.
» 9. *Rhoicosigma mediterraneum* CL.
» 10. *Navicula (Fluminensis var.?) Floridana* CL.
» 11. *N. cruciata* CL.
» 12. *N. Platessa* CL.
» 13. *N. Grœnlandica* CL.
» 14. *N. Hennedyi* var. *Tahiteusis* CL.
» 15. *N. Hennedyi* var. *minuta* CL.

Plate II.

- Fig. 16. *Navicula Eugeniæ* CL.
» 17. *N. rudis* CL.
» 18. *N. Holmiensis* CL.
» 19. *N. Hennedyi* var. *undulata* CL.
» 20. *N. (excavata var.?) Angelorum* CL.
» 21. *N. Febigerii* CL.
» 22. *N. Cluthensis* var. *minuta* CL.
» 23. *N. Cluthensis* var. *maculifera* CL.
» 24. *N. Fromenteræ* CL.
» 25. *N. bicuspidata* CL. et GRUN.
» 26. *N. mesoleia* CL.
» 27. *N. Hauckii* CL.

Plate III.

- Fig. 28. *Navicula Anderssonii* CL.
» 29. *N. margiuulata* CL.
» 30. *N. Powellii* LEWIS var. *Gallapageusis* CL.
» 31. *N. Wittii* GRUN. *
» 32. *N. quadriseriata* CL. et GRUN.
» 33. *N. Castracanei* GRUN. *
» 34. *N. Petitiana* GRUN. *
» 35. *N. Bruchii* GRUN. *

*) Delineated by Mr. GRUNOW.

- Fig. 36. *Navicula multiseriata* GRUN. *
» 37. *N. amica* CL. et GRUN.
» 38. *N. jugata* CL.
» 39. *N. Pensacola* CL.
» 40. *N. Gallapagensis* CL.
» 41. *Stauroneis Balearica* CL.
» 42. *St. Africana* CL.
» 43. *St. pachycephala* CL.
» 44. *Schizostauron Crucicula* GRUN.
» 45. *Stauroneis Sagitta* CL.
» 46. *St. sulcata* CL.

Plate IV.

- Fig. 47. *Nitzschia ocellata* CL.
 » 48. *N. praelonga* CL.
 » 49. *Surirella formosa* CL.
 » 50. *S. Caldensis* CL.
 » 51. *S. degenerans* CL.
 » 52. *Campylodiscus Margaritarum* CL.
 » 53. *C. (Ecclesianus* var.?) *perauplus* CL.
 » 54. *Plagiogramma rutilarioides* CL.
 » 55. *P. spinosum* CL.
 » 56. *Biddulphia Morouensis* CL.
 » 57. *Rutilaria recens* CL.

Plate V.

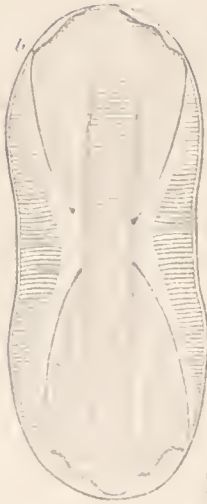
- Fig. 58. *Actinella Guianensis* GRUN.
» 59. *Asterolampra Balcarica* CL.
» 60. *Coscinodiscus undulatus* CL.
» 61. *Liradiscus Capensis* CL.
» 62. *Stephanodiscus* (*bellus* var.?) *Novae Zeelandiae* CL.
» 63. *Cyclotella Meneghiniana* var. *stelligera* CL. et GRUN. *a.* from New Zealand; *b.* from France;
 c. *stellulifera* GRUN.
» 64. *Anliscus* (?) *insignis* CL.
» 65. *Melosira* (*Podosira*?) *tuberenlosa* CL.
» 66. *Stictodiscus Novaræ* CL.
» 67. *Biddulphia tentaculifera* CL.

Plate VI.

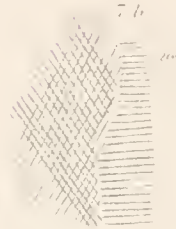
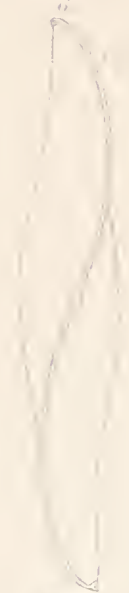
- Fig. 68. *Triceratium Tripos* CL.
 » 69. *T. Anderssonii* CL.
 » 70. *T. læve* CL.
 » 71. *T. (Terpsinoe?) trifoliatum* CL.
 » 72. *T. Gallapagense* CL.
 » 73. *T. productum* GREY. var. *Balcaricum* CL. et GRUN.
 » 74. *Biddulphia Gallapagensis* CL.
 » 75. *Triceratium (Terpsinoe?) Javanicum* CL.
 » 76. *T. margaritifera* CL.
 » 77. *Chaetoceros Dichæta* EHB.
 » 78. *Rhizosolenia (alata var.?) gracillima* CL.



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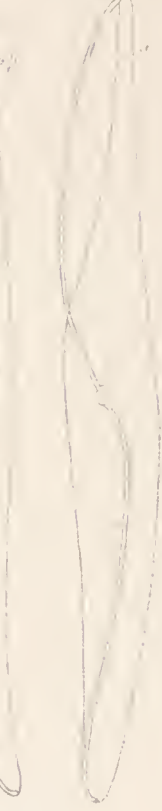
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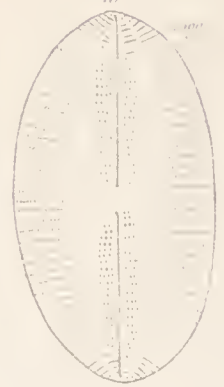
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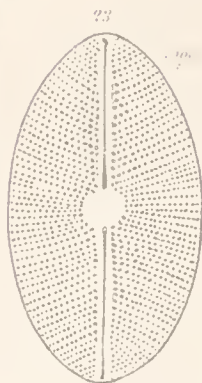
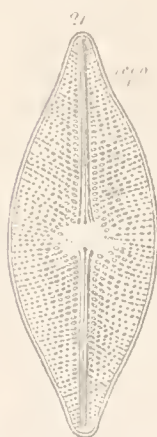
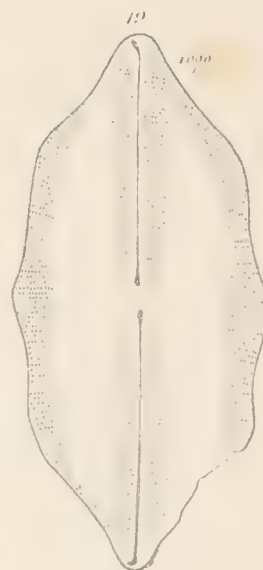
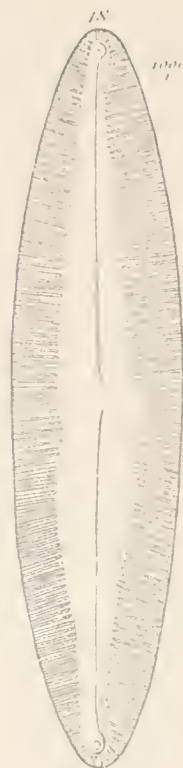
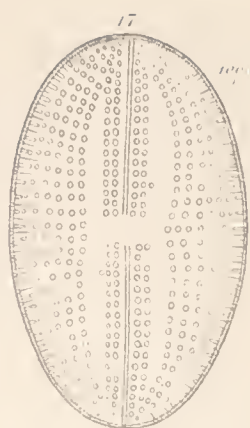
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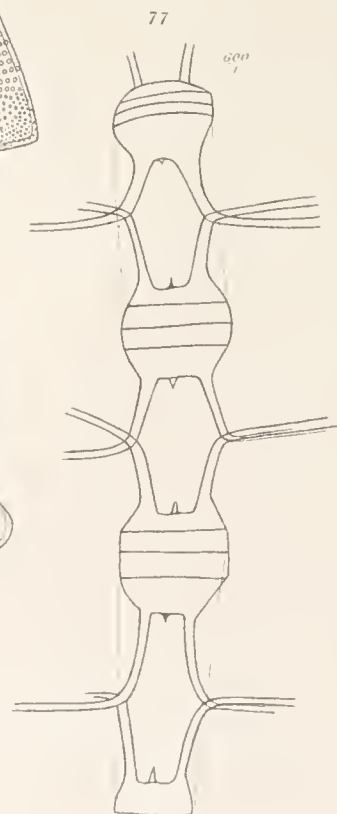
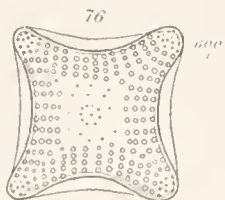
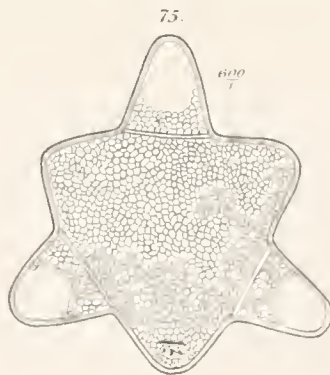
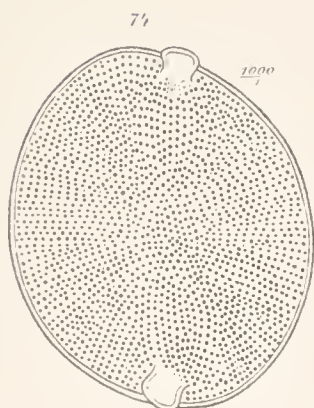
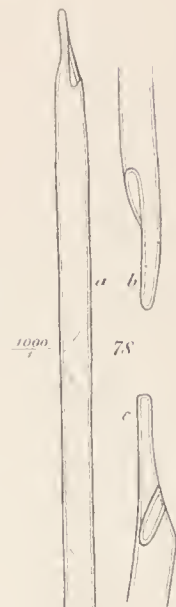
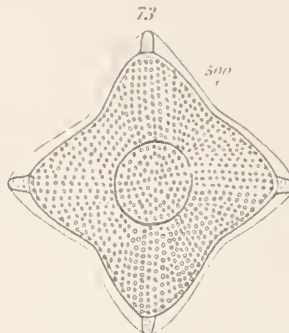
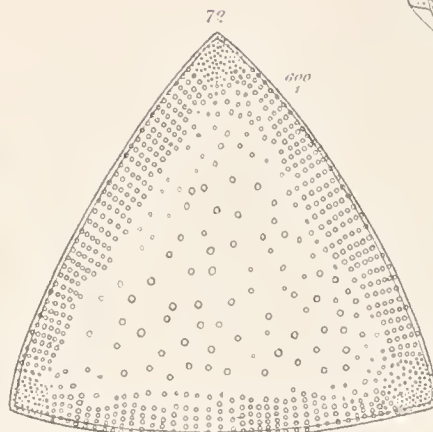
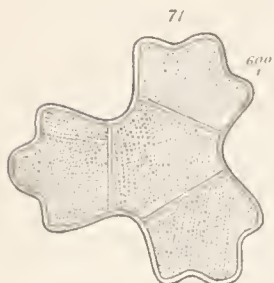
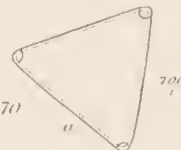
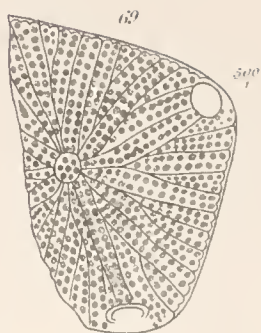
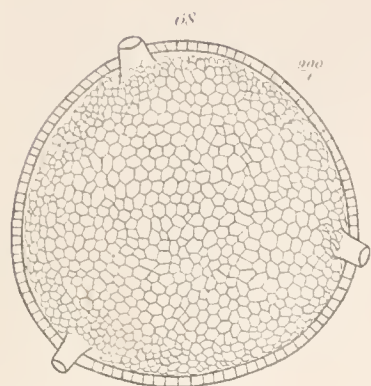
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Clare P. T.

Sur quelques espèces
nouvelles ou peu connues.

1893-94
1

par découvrir après des recherches répétées ; l'autre vase, au contraire, présentait sur la légère couche de boue dont son fond était recouvert un riche dépôt de Diatomées. J'en conclus que, laissés en repos pendant un temps suffisant, les germes descendaient au fond de la cuve dont ils s'élevaient à la moindre secousse.

Dans les deux vases je trouvai quelques algues vertes unicellulaires, introduites par l'intermédiaire de l'air.

Me servant de deux vases de la même dimension dans lesquels je versai un demi-litre d'eau puisée à la même source de ma provision, je résolus de varier mes expériences. Je filtrai lentement et soigneusement, au travers de plusieurs doubles de papier à filtrer employé dans les laboratoires, de l'eau que j'avais préalablement agitée. Le filtre commença à laisser passer 90 gouttes à la minute, et il fallut 90 minutes pour filtrer un litre. Je mis de côté les filtres employés et les plaçai dans un peu d'eau pour les empêcher de sécher. Comme à l'ordinaire, environ six semaines après, cette eau filtrée produisit une moisson abondante de Diatomées.

Avant de conclure, je rapporterai une autre de mes expériences :

Après avoir complètement mêlé l'eau de la cuve qui était dans la cave, on en prit un litre, et comme auparavant cette eau fut filtrée et les filtres employés mis de côté dans un peu d'eau de mer. Je fis bouillir cette eau pendant 20 minutes et, une fois refroidie, je la divisai dans deux vases, dans l'un desquels on lava tous les filtres conservés ; je plaçai les deux vases sur la même fenêtre et, au bout de six semaines, je les examinai au microscope. Le vase qui contenait l'eau pure ne contenait aucune Diatomée, et il fallut des recherches répétées pour trouver une *navicule* et un *amphora* dans celui où les papiers avaient été lavés. Dans chacun des vases, toutefois, se trouvaient des algues vertes unicellulaires apportées évidemment par l'air. Les germes de Diatomées étaient si petits qu'ils avaient pu passer presque entièrement au travers des filtres, et je me demandai si les germes qui avaient été retenus n'étaient pas plus grands que ceux qui avaient passé, de toute façon, les Diatomées ainsi produites, d'après tous mes examens, étaient de formes naturelles.

Je fus ainsi forcé d'admettre que j'avais affaire à des germes de Diatomées ou spores dont la vitalité avait été préservée dans l'obscurité pendant seize ans.

De là ma surprise, quand mon ami feu Dr Wolle, dans ses « *Diatomaceæ of North America* », p. 13, tira de mon travail les déductions suivantes :

« Quant à la longévité des Diatomées..., on a trouvé qu'elles peuvent survivre quoique conservées pendant de longues périodes dans l'obscurité. »

« Indépendamment de leur reproduction par conjugation, il y a multiplication par division, et comme les Diatomées ne croissent pas, ces divisions tendent à rendre les Diatomées qui en résultent de plus en plus petites, jusqu'à ce qu'atteignant une exigüité telle, observée chez les NITZSCHIA, les NAVICULA et les AMPHORA, elles peuvent passer, tout en étant vivantes, au travers du papier à filtrer. »

Je ne puis m'empêcher de considérer cette déduction comme une singulière erreur ; en un mot, comme étant contradictoire aux trois faits qui me paraissent être prouvés par mes expériences.

C'était la vitalité non du frustule ou plante, mais plutôt du germe ou spore qui avait été conservée pendant une période aussi longue et dans des circonstances si peu favorables ; car, avant leur développement, je n'avais pu découvrir avec l'aide du microscope aucune Diatomée vivante ; et certainement, si provenant d'un germe ou spore l'âge de division d'une Diatomée doit être précédé d'une période de croissance ou si l'on veut embryonnaire, assurer que les *Nitzschia*, les *Navicula* et les *Amphora* peuvent passer à travers les pores du papier à filtrer me semble assez surprenant.

Pendant seize ans, dans la tranquillité et dans l'obscurité, la vitalité de ces germes a sommeillé ; comment donc s'étonner que, lorsque revenant à une vie active, il se produise des excentricités dans leur développement ? Ce qui m'étonne le plus c'est que, pour une forme irrégulière, il se trouve plus d'un millier d'individus conservant leur caractère particulier ; de plus, quelques-uns d'entre eux avaient acquis un développement si monstrueux qu'il dépassait toute description.

Quelques-unes de ces formes sont représentées pl. II, fig. 4 à 22, qui est une reproduction des tableaux qui accompagnent mon étude publiée dans le *Journal of the New-York Microscopical Society*, december 1886, sous le titre : « *Raising Diatoms in the Laboratory* ».

Sur quelques espèces nouvelles ou peu connues

Par M. P.-T. Cleve.

Navicula Gamma Cl., n. sp.

(Pl. I, fig. 1, 2.)

Valve lancéolée à extrémités subrostrées. Longueur, 0,036 mm. ; largeur, 0,014 mm. Fissures terminales de la ligne médiane tournées en sens contraire. Aire axiale indistincte. Aire centrale assez large, orbiculaire ou légèrement transversale. Stries au centre au nombre de 12, et vers les extrémités 13 en 0,01 mm., radiantes jusqu'aux sommets, grossièrement perlées. Perles, 14 en 0,01 mm., disposées en lignes horizontales un peu ondulées.

Hab. : Eau douce ou un peu saumâtre ; Amatitlan, Guatémala, fossile (rare).

Var. rectilineata Cl., pl. I, fig. 2. Longueur, 0,032 mm. ; largeur, 0,014 mm. Stries, 16 en 0,001 mm., disposées en lignes longitudinales droites, 17 en 0,01 mm.

Hab. : Eau saumâtre ; Cameroon, Afrique (rare).

Navicula Epsilon Cl., n. sp. (1)

(Pl. I, fig. 3.)

Valve lancéolée à extrémités rostrées. Longueur, 0,08 à 0,01 mm. ; largeur, 0,04 mm. Ligne médiane à pores centraux dilatés et à fissures terminales tournées en sens contraire. Aire axiale

(1) Le nombre des espèces de *Navicula* est si considérable qu'il nous a fallu employer l'alphabet grec pour les nouvelles dénominations.

étroite, légèrement dilatée autour du nodule central. Stries, 10 en 0,01 mm., radiantes jusqu'aux extrémités, perlées. Perles distancées inégalement; vers les bords, 10 en 0,01 mm.; à l'intérieur, où paraît se trouver une dépression, 6 en 0,01 mm., disposées en séries longitudinales ondulées.

Hab. : Marin, Chine, Japon.

Navicula Alpha Cl., n. sp.

(Pl. I, fig. 4.)

Valve largement lancéolée à extrémités subrostrées obtuses. Longueur, 0,062 mm.; largeur, 0,03 mm. Ligne médiane à pores centraux épaissis et à fissures terminales tournées en sens contraire. Stries, 7 en 0,01 mm., radiantes jusqu'aux extrémités, où elles sont un peu plus serrées (9 en 0,01 mm.), grossièrement perlées. Perles, 8 en 0,01 mm. Stries médianes de longueur inégale.

Hab. : Marin, Japon (*Tempère*).

Navicula Eta Cl., n. sp.

(P. I, fig. 5.)

Valve hexagonale ou largement linéaire, extrémités cunéiformes. Longueur, 0,044 mm.; largeur, 0,019 mm. Aire axiale étroite, mais distincte, légèrement dilatée au milieu. Stries, 16 au centre, 20 vers les extrémités en 0,01 mm., radiantes jusqu'aux extrémités, perlées. Perles, 24 en 0,01 mm.

Hab. : Marin, Japon (*Tempère*), Mer Rouge.

Cette espèce se rapproche beaucoup de la Nav. humerosa, mais elle en diffère par sa taille plus petite et ses stries plus serrées.

Navicula Merandrina Cl., n. sp.

(Pl. I, fig. 6.)

Valve elliptique, à extrémités arrondies. Longueur, 0,045 à 0,065 mm.; largeur, 0,021 à 0,031 mm. Aire axiale étroite. Aire centrale orbiculaire assez grande. Stries, 19 à 21 en 0,001 mm., radiantes vers les extrémités, composées de perles un peu allongées, disposées en séries longitudinales ondulées, 9 à 10 en 0,01 mm. Stries médianes de longueur inégale.

Hab. : Eau douce, Oregon (fossile).

Navicula Delawarensis Grun. Mst.

(Pl. I, fig. 7, 8.)

Valve elliptique lancéolée, à extrémités subrostrées. Longueur, 0,85 à 0,1 mm.; largeur, 0,044 mm. Ligne médiane à pores centraux un peu écartés. Aire axiale étroite; aire centrale assez grande, arrondie. Stries, 14 à 15 en 0,01 mm., plus serrées vers les extrémités, perlées.

Perles, environ 11 en 0,01 mm., disposées en séries longitudinales ondulées. Stries médianes de longueur inégale.

Hab.: Eaux saumâtres, Connecticut (*Tempère*), Embouchure du Delaware.

Cette espèce se rapproche beaucoup de la *Nav. pusilla* W. Sm., mais elle est beaucoup plus large.

***Navicula Demerara* Grun. Mst.**

(Pl. I, fig. 9.)

Valve largement lancéolée, à extrémités aigues ou subobtuses. Longueur, 0,046 à 0,085 mm.; largeur, 0,017 à 0,03 mm. Aire axiale très étroite ou presque indistincte. Aire centrale assez grande, irrégulière; une ou plusieurs grandes perles du côté du nodule. Fissures terminales de la ligne médiane tournées en sens contraire. Stries, 15 à 17 en 0,01 mm.; un peu plus serrées vers les extrémités, radiant, ponctuées. Perles, 19 en 0,01 mm. Stries médianes de longueur inégale; stries terminales parallèles.

Hab.: Eau douce, Demerara River, Surinam (Coll. Kinker).

***Navicula Delta* Cl., n. sp.**

(Pl. I, fig. 10.)

Valve elliptique, à extrémités rostrées. Longueur, 0,032 mm.; largeur, 0,016 mm. Aire axiale étroite; aire centrale assez large, orbiculaire. Stries, 12 en 0,001 mm., radiant jusqu'aux extrémités, grossièrement perlées. Perles, 12 en 0,01 mm., également espacées. Stries médianes de longueur inégale.

Hab.: Marin, Pointe de Galle, Ceylan (Coll. Weissflog).

***Navicula Tau* Cl., n. sp.**

(Pl. I, fig. 11.)

Valve allongée, légèrement bicontractée, à extrémités cunéiformes. Longueur, 0,037 mm.; largeur, 0,01 mm. Aire axiale étroite. Aire centrale distincte orbiculaire. Stries, 20 en 0,01 mm., radiant jusqu'aux extrémités; stries médianes de longueur inégale.

Hab.: Eau douce, Demerara River.

Cette espèce appartient, ainsi que la *Nav. limicola*, à la section *Navicula heterosticha* Cl.

***Navicula limicola* Cl., n. sp.**

(Pl. I, fig. 12.)

Valve elliptique, à extrémités arrondies. Longueur, 0,046 mm.; largeur, 0,0017 mm. Aire axiale étroite; aire centrale assez large, orbiculaire. Stries, environ 25 en 0,01 mm., légère-

ment arquées et radiantés jusqu'aux extrémités ; à ponctuation fine, mais distincte ; stries médianes à ponctuation plus grosse vers l'aire centrale et de longueur inégale.

Hab. : Eau saumâtre, Cameroon, Afrique (rare).

Cette espèce appartient à la petite section *Navicula heterosticha* qui renferme, en outre, *Navicula cocconeiformis* Greg et *Navic. scutiformis* Grun.

Navicula Pi Cl., n. sp.

(Pl. I, fig. 13.)

Valve allongée, rhomboïdale, à extrémités obtuses. Long., 0,08 mm.; larg., 0,022 mm. Aire axiale indistincte; aire centrale petite. Fissures terminales de la ligne médiane tournées dans le même sens. Stries, 11 en 0,01 mm., plus serrées vers les extrémités (12 en 0,01 mm.) presque parallèles, perlées. Perles, 12 en 0,01 mm. disposées en séries longitudinales ondulées.

Hab. : Marin, Chine (Coll. Van Heurck).

Cette espèce se rapproche beaucoup des *Nav. Doljensis* et *Nav. Brunii* Pant.

Navicula Grovei Cl., n. sp.

(Pl. I, fig. 14.)

Valve légèrement lancéolée, à extrémités obtuses. Longueur, 0,06 mm.; largeur, 0,03 mm. Aire axiale étroite; aire centrale large, dilatée. Fissures terminales tournées dans le même sens. Stries, 16 en 0,01 mm., radiantés jusqu'aux extrémités, perlées. Perles également espacées, 15 en 0,01 mm. Quelques stries médianes sont plus courtes que les autres.

Hab. : Marin, Oamaru, Nouvelle-Zélande (fossile).

Mastogloia rimosa Cl., n. sp.

(Pl. I, fig. 15.)

Valve rhomboïdale, lancéolée, à extrémités rostrées. Longueur, 0,037 mm.; largeur, 0,013 mm. Ligne médiane ondulée. Aire axiale étroite, mais distincte. Logettes, 10 en 0,01 mm., rectangulaires, formant une bande atteignant les apiculi. Stries non perlées, 11 en 0,01 mm., légèrement radiées, convergentes aux extrémités, traversées par une aire latérale étroite.

Hab. : Marin, Bahamas (Grove Coll.).

Mastogloia obesa Cl.

(Pl. I, fig. 16.)

Valve largement lancéolée, acuminée. Longueur, 0,04 mm.; largeur 0,024 mm. Ligne médiane légèrement ondulée. Aire axiale très étroite; aire centrale quadrangulaire s'unissant aux aires latérales arquées. Logettes, 6 en 0,01 mm., quadrangulaires, formant une bande atteignant les extrémités. Stries, 12 en 0,01 mm., composées de grosses perles espacées. Entre les stries marginales et les aires arquées, se trouvent quelques séries de perles allongées.

Hab. : Marin, Java.

Mastogloia bahamensis, Cl., n. sp.*(Pl. I, fig. 17.)*

Valve elliptique ou subrhomboïdale. Longueur, 0,045 mm. ; largeur, 0,022 mm. Ligne médiane non ondulée. Aires axiale et centrale indistinctes. Logettes, 12 en 0,01 mm., égales, rectangulaires, formant une bande marginale atteignant les extrémités. Stries, 13 en 0,01 mm., composées de grosses perles allongées, disposées en lignes longitudinales ou irrégulièrement décussées.

Hab. : Iles Bahamas (Coll. Grove).

Cette espèce ressemble par ses caractères au *Mastoglia affirmata* (Leud.—Fortmorel) Cl., mais elle est beaucoup plus petite.

Mastogloia cuspidata Cl., n. sp.*(Pl. I, fig. 18.)*

Valve elliptique, apiculée. Longueur, 0,026 mm. ; largeur, 0,01 mm. Ligne médiane fortement ondulée. Aires axiale et centrale indistinctes. Logettes, 6 en 0,01 mm., quadrangulaires, formant une bande marginale n'atteignant pas les extrémités. Stries, 25 en 0,01 mm., parallèles, indistinctement ponctuées.

Hab. : Marin, Iles Bahamas (Coll. Grove).

Cette espèce ressemble beaucoup au *M. minuta* Grév., dont elle diffère par sa striation beaucoup plus fine.

Mastogloia antiqua Cl., n. sp.*(Pl. I, fig. 19.)*

Valve rhomboïdale. Longueur, 0,08 mm. ; largeur, 0,03 mm. Ligne médiane légèrement ondulée. Aire axiale étroite, lancéolée. Logettes, 6 en 0,01 mm., égales, quadrangulaires, réunies en une bande intra-marginale s'arrêtant à une certaine distance des extrémités. Stries, 18 en 0,01 mm., parallèles, légèrement radiées vers les extrémités. Perles, 18 en 0,01 mm., disposées en séries longitudinales ondulées.

Hab. : Karand, Hongrie, fossile (Coll. Deby).

Mastogloia delicatula Cl., n. sp.*(Pl. I, fig. 20.)*

Valve lancéolée, acuminée. Longueur, 0,037 mm. ; largeur, 0,014 mm. Ligne médiane faiblement ondulée. Aires axiale et centrale indistinctes. Logettes, 6 en 0,01 mm., égales, formant une bande marginale atteignant presque les extrémités. Stries, 21 en 0,01 mm., parallèles, composées de petites perles disposées en séries décussées.

Hab. : Iles Bahamas (Coll. Grove).

Planche II

Les figures de cette planche ont été dessinées avec soin d'après les formes observées dans une préparation faite avec la culture C de la première série d'essais; elles sont grossies 1,600 fois, excepté figures 2^a, 2^b, 2^c et 8^a qui sont à un grossissement de 800 diamètres.

- Fig. 1 Forme rare dans la culture.
- 2 Forme assez commune et que l'on retrouve au centre des séries représentées par les figures 20, 21 et 22.
- 3 à 17 représentent les monstruosités dont la figure 3 est la forme typique.
- 15, 16 et 17 sont des formes anormales particulières, dont la figure 17, qui s'éloigne de la figure 3, semble être la forme normale.
- 42 Groupe de petits amphora grossis 350 fois.
- 49 Série provenant de la forme 2^c.
- 20, 21 et 22. Séries ayant pour point de départ la forme représentée figure 2.

Planche I

Fig. 1-2	Navicula Gamma Cl., n. sp.	GROSS. 1000	Page 12
— 3	Navicula Epsilon Cl., n. sp.	— 500	— 12
— 4	Navicula Alpha Cl., n. sp.	— 1000	— 13
— 5	Navicula Eta Cl., n. sp.	— 1000	— 13
— 6	Navicula Mœandrina Cl., n. sp.	— 1000	— 13
— 7	Navicula Delawarensis GRUN., mst.	— 500	— 13
— 8	— — — (partie de la valve)	— 1000	— 13
— 9	Navicula Demerara GRUN Mst.	— 1000	— 14
— 10	Navicula Delta Cl., n. sp.	— 1000	— 14
— 11	Navicula Tau Cl., n. sp.	— 1000	— 14
— 12	Navicula limicola Cl., n. sp.	— 1000	— 14
— 13	Navicula Pi Cl., n. sp.	— 1000	— 15
— 14	Navicula Grovei Cl., n. sp.	— 1000	— 15
— 15	Mastogloia rimosa Cl., n. sp.	— 1000	— 15
— 16	Mastogloia obesa Cl., n. sp.	— 1000	— 15
— 17	Mastogloia bahamensis Cl., n. sp.	— 1000	— 16
— 18	Mastogloia cuspidata Cl., n. sp.	— 1000	— 16
— 19	Mastogloia antiqua Cl., n. sp.	— 1000	— 16
— 20	Mastogloia delicatula Cl., n. sp.	— 1000	— 16



PLANCHE III

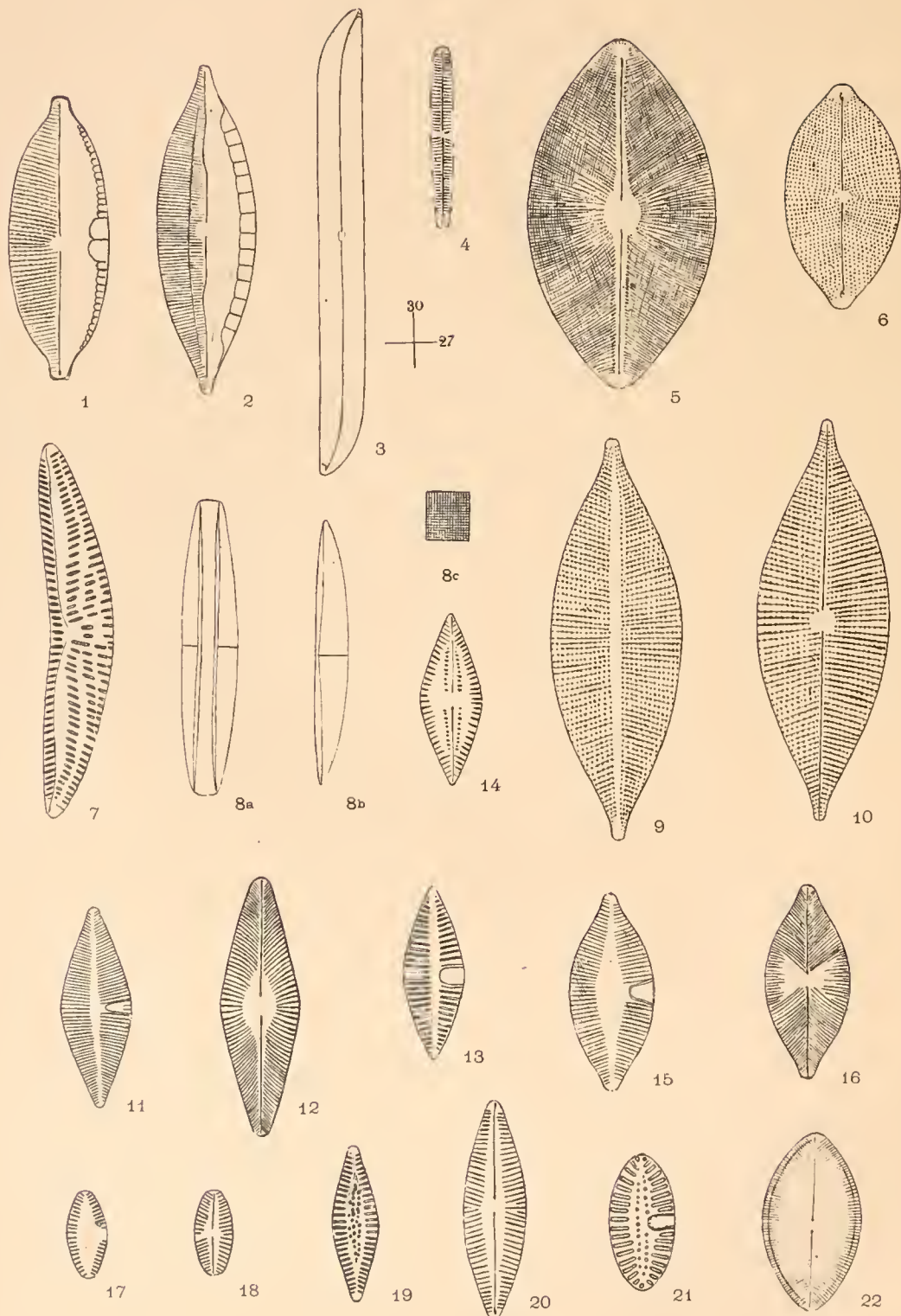


Planche III

Fig.		GROSS.	1000	Pages
1	Mastogloia floridea Cl., n. sp.			
— 2	Mastogloia Pisciculus Cl., n. sp.	—	1000	—
— 3	Gyrosigma Temperci Cl., n. sp.	—	500	—
— 4	Gomphonema Astuarii Cl., n. sp.	—	1000	—
— 5	Navicula Theta Cl., n. sp.	—	1000	—
— 6	Navicula Omega Cl., n. sp.	—	1000	—
— 7	Amphora Scabriuscula Cl. et Grove, n. sp.	—	1000	—
— 8	Amphora elegans Peragallo, n. sp. (a).	—	500	—
— —	— — — (b).	—	500	—
— —	— — — (c).	—	1000	—
— 9	Achnanthes (Achnanthidium Cl.) Margaritaceum Cl., n. sp. Valve supérieure.	—	1000	—
— 10	— — — — — inférieure.	—	1000	—
— 11	Achnanthes (Actinoneis Cl.) heteromorpha GRUN — supérieure.	—	500	—
— 12	— — — — — inférieure.	—	500	—
— 13	Achnanthes (Actinoneis Cl.) inopinata Cl. — supérieure.	—	1000	—
— 14	— — — — — inférieure.	—	1000	—
— 15	Achnanthes (Heteroneis Cl.) Vaszaryi Cl. — supérieure.	—	1000	—
— 16	— — — — — inférieure.	—	1000	—
— 17	Achnanthes (Heteroneis Cl.) Americana Cl., n. sp. — supérieure.	—	1000	—
— 18	— — — — — inférieure.	—	1000	—
— 19	Achnanthes (Heteroneis Cl.) Lilljeborgii GRUN. — supérieure.	—	1000	—
— 20	— — — — — inférieure.	—	1000	—
— 21	Cocconeis (Heteroneis Cl.) Lagerheimii Cl., n. sp. — supérieure.	—	1000	—
— 22	— — — — — inférieure.	—	1000	—

Sur quelques espèces nouvelles ou peu connues

(Suite.)

Par P. T. Cleve.

Mastogloia floridea Cl., n. sp.

(Pl. III, fig. 1.)

Valve elliptique, rostrée. Longueur, 0,043 mm. ; largeur, 0,015 mm. Ligne médiane droite. Aire axiale indistincte ; aire centrale petite, arrondie. Logettes inégales, les deux ou quatre médianes beaucoup plus larges que les autres, 8 ou 9 en 0,01 mm., formant une bande étroite et marginale s'étendant presque aux extrémités. Stries, 15 en 0,01 mm. légèrement radiantes au milieu de la valve, parallèles vers les extrémités, ponctuées, les points (14 en 0,01 mm.) disposés en séries longitudinales.

Hab. : Marin, Pensacola (Grove Coll.).

Mastogloia pisciculus Cl., n. sp.

(Pl. III, fig. 2.)

Valve lancéolée, subacuminée. Longueur, 0,05 mm. ; largeur, 0,015 mm. Ligne médiane ondulée. Aire axiale indistincte ; aire centrale petite, orbiculaire. Logettes, 4 en 0,01 mm., égales, quadrangulaires, formant une bande marginale n'atteignant pas les extrémités. Stries, 21 en 0,01 mm., presque parallèles, un peu radiantes aux sommets, finement ponctuées, les ponctuations disposées en séries longitudinales. A quelque distance de la ligne médiane, les stries sont traversées par une ligne longitudinale ; entre celle-ci et la ligne médiane elles sont moins marquées.

Hab. : Marin, Pensacola (Grove Coll.).

Gyrosigma Temperei Cl., n. sp.

(Pl. III, fig. 3.)

Valve linéaire droite, à extrémités obliquement arrondies. Longueur, 0,14 mm. ; largeur 0,014 mm. Ligne médiane centrale droite, courbée aux extrémités. Stries longitudinales, 30 transversales, 27 en 0,01 mm.

Hab. : Eaux saumâtres, Connecticut.

Je propose de diviser en deux genres l'ancien genre *Pleurosigma*. J'appellerai *Pleurosigma*, les formes à striation oblique, et *Gyrosigma* celles à striation droite, nom plus ancien et déjà donné par Hassall.

Gomphonema æstuarii Cl., n. sp.

(Pl. III, fig. 4.)

Valve presque linéaire, à extrémités arrondies. Longueur, 0,02 à 0,028 mm. ; largeur, 0,002 à 0,003 mm. Aire axiale nulle ; aire centrale, un pseudo-stauros transversal et assez large, sans perles isolées. Les stries qui bordent l'aire centrale sont radiantes, les autres parallèles, 20 en 0,01 mm. A la base de la valve inférieure se trouve un diaphragme distinct.

Hab. : Sable de Hastings, Angleterre (Coll. Grove).

Navicula Theta Cl., n. sp.

(Pl. III, fig. 5.)

Valve elliptique. Longueur, 0,055, mm. ; largeur, 0,028 mm. Aire axiale étroite, linéaire ; aire centrale arrondie, à bord fimbrié. Stries, au centre de la valve où elles sont de longueur inégale, 20 en 0,01 mm. ; vers les extrémités, 25 en 0,01 mm., radiantes, dans les sommets mêmes presque parallèles, finement ponctuées, les points (21 en 0,01 mm.) formant des stries arquées parallèles aux bords de la valve.

Hab. : Eau douce, Orégon (fossile).

Cette espèce appartient à la section *Naviculæ heterostichæ* et se rapproche de la *Nav. limicola* Cl., et de la *Nav. cocconeiformis* Greg.

Navicula Omega Cl., n. sp.

(Pl. III, fig. 6.)

Valve elliptique, subrostrée. Longueur, 0,026 à 0,035 mm. ; largeur, 0,015 à 0,018 mm. Ligne médiane aboutissant à quelque distance du bord de la valve. Aire axiale indistincte ; aire centrale petite, arrondie. Stries, 17 en 0,01 mm., légèrement radiantes jusqu'aux sommets, distinctement perlées. Perles, 17 en 0,01 mm., arrangées en lignes longitudinales presque droites.

Hab. : Marin, Etretat (Temp. et Perag. Type n° 406).

Cette espèce, nommée dans les types de Temp. et de Perag. *Nav. marina*, en est bien distincte par l'arrangement de ses perles, par sa ligne médiane abrégée ainsi que par ses dimensions.

Amphora scabriuscula Cl. et Grove, n. sp.

(Pl. III, fig. 7.)

Valve linéaire obtuse. Longueur, 0,057 mm. ; largeur, 0,01 mm. Côté dorsal sans ligne longitudinale, mais à aire assez large. Structure : alvéoles assez larges, disposées en lignes radiantes, 10 en 0,01 mm., et finement striées *transversalement*. Côté ventral entièrement couvert de stries robustes, 10 en 0,01 mm.

Hab. : Marin, Détroit de Macassar (Coll. Grove).

Cette espèce offre un intérêt considérable, en ce que sa structure est exactement celle du genre *Trachyneis* (*Navicula*) *aspera* Ehr. Elle ressemble en ceci à l'*Amphora Clevei* Grun.

Amphora elegans Perag., n. sp.

(Pl. III fig 19.)

Frustule allongé, étroit, à bords très peu convexes et à extrémités tronquées. Longueur, 0,09 mm. ; largeur, 0,015 mm. Zone connective simple. Valve étroite, linéaire, aiguë. Longueur, 0,08 mm. ; largeur, 0,01 mm. Nodule central dilaté en stauros. Côté dorsal sans ligne longitudinale et sans espaces hyalins. Côté ventral ayant la même structure que le côté central. *Structure* : perles fines disposées en stries transversales, 22 en 0,01 mm., et en stries droites longitudinales, 25 en 0,01 mm.

A. elegans (Coll. Tempère et Peragallo, n° 414).

Hab. : Marin, Cabours.

C'est une espèce remarquable et fort intéressante, étant une forme asymétrique du type de la *Navicula* (Endostauron) *erucigera* W. Sm.

***Achnanthes* (*Achnanthidium* Cl.) *Margaritarum* Cl., n. sp.**

(Pl. III, fig. 9-10.)

Lancéolée, à extrémités légèrement allongées. Longueur, 0,05 à 0,06 mm. ; largeur, 0,02 mm. *Valve supérieure* à aire axiale étroite. Stries légèrement radiantes, 10 (au centre) à 13 (aux extrémités), composées de perles distinctes, disposées en lignes droites longitudinales, 15 en 0,01 mm. *Valve inférieure* sans aire axiale et à aire centrale petite et orbiculaire. Stries semblables à celles de la valve supérieure.

Hab. : Marin. Pearl Islands !

Cette remarquable espèce rappelle beaucoup, par sa valve supérieure, le *Raphoneis amphiceros*. C'est une forme tout à fait à part (1).

***Achnanthes* (*Actinoneis* Cl.) *heteromorpha* Grun**

(Pl. III, fig. 11-12.)

Rhomboïdale ou lancéolée. Longueur, 0,046 à 0,08 mm. ; largeur, 0,02 à 0,025 mm. *Valve supérieure* à aire axiale étroite, ayant vers l'un des bords une marque en fer de cheval. Côtes, 8 à 10 en 0,01 mm., légèrement radiantes, indistinctement (d'après Grunow finement) ponctuées. *Valve inférieure* à aire lancéolée assez large. Stries, 7 (au milieu) à 9 (vers les extrémités) en 0,01 mm., fortement radiantes jusqu'aux sommets.

A. heteromorpha Grun, *Arctische Diatomeen*, p. 23.

Hab. : Eau douce, Demerara River.

***Achnanthes* (*Actinoneis* Cl.) *inopinata* Cl.**

(Pl. III, fig. 13-14.)

Rhomboïdale, aiguë. Longueur, 0,027 mm. ; largeur, 0,009 mm. *Valve supérieure* à aire axiale très étroite, portant une marque en fer de cheval sur l'un des bords. Côtes, 12 en 0,01 mm., presque parallèles, non ponctuées. *Valve inférieure* à aire axiale étroite. Aire centrale quadrangulaire réunie aux aires latérales lunaires. Stries, 14 en 0,01 mm., radiantes.

Hab. : Marin, Dépôt de Baldjik (fort rare).

***Achnanthes* (*Heteroneis* Cl.) *Vaszaryi* Pant., var. *Oregonica* Cl.**

(Pl. III, fig. 15-16.)

Forme typique A. VASZARY PANT. — Rhomboïdale, aiguë. Longueur, 0,06 mm. ; largeur,

(1) Je propose de réunir les *Cocconeis* et les *Achnanthes* et de former de nouveaux genres des formes qui sont liées par des caractères essentiels, sous les noms d'*Actinoneis*, d'*Heteroneis*, d'*Achnanthes*, d'*Achnanthidium*, etc.

0,03 mm. *Valve supérieure* inconnue. *Valve inférieure* à aire axiale très étroite et à aire centrale assez large, dilatée et fimbriée vers les bords de la valve. Stries médianes de longueur inégale, 13 en 0,01 mm., presque parallèles; les autres stries fortement radiantés jusqu'aux extrémités, environ 20 en 0,01 mm. (d'après la figure de M. Pantocsek).

Navicula Vaszaryi Pant., Diat. foss. Ungarns III, pl. XVI, fig. 239.

Hab. : Eau douce (?), Nyermegy (Pant.).

VAR. OREGONICA Cl. — Lancéolée, à extrémités subrostrées, obtuses. Longueur, 0,03 mm.; largeur, 0,013 mm. *Valve supérieure* à aire axiale lancéolée, mesurant un tiers de la largeur de la valve et portant une marque en fer de cheval sur l'un des bords, munis de côtes. Côtes légèrement radiantés, 16 en 0,01 mm., alternant avec des perles très fines disposées en stries obliques, environ 30 en 0,01 mm. *Valve inférieure* semblable au type. Stries médianes, 18 en 0,01 mm.; les autres, 26 en 0,01 mm., plus serrées vers les extrémités.

Hab. : Eau douce, Orégon (fossile).

C'est une espèce fort intéressante dont la valve inférieure offre beaucoup de ressemblance avec celle de l'*Achnanthes* (Actinoneis Cl.) *danica* Flögel. La différence entre la *Navicula Vaszaryi* Pant. et la valve inférieure de la forme de l'Orégon, est de si peu d'importance que je n'ai pas cru devoir la considérer comme une espèce distincte. (A suivre).

Note

sur l'examen comparatif des coupes faites sur les ciments calcaires diatomifères
de Mors (Jutland), et de Sendai (Japon)

Par J. Tempère.

Dans leur intéressant travail publié dans le tome VIII des *Annales de la Société Belge de Microscopie*, sur la composition des ciments calcaires du Jutland et sur la structure des Diatomées qu'ils contiennent, MM. W. Prinz et E. Van Ermengen ont fait judicieusement remarquer que ces dépôts s'étaient formés dans des conditions toutes spéciales de tranquillité, indiquées par la position qu'occupent les Diatomées qu'on y trouve. En effet, les valves et les frustules y observent toujours une direction horizontale, ce qui permet, par une bonne orientation verticale, d'obtenir des coupes parfaitement nettes et régulières de ces Diatomées, laissant voir ainsi très nettement leur structure interne, et cela bien mieux que dans l'ingénieux procédé de Flögel, où les parties constituantes peuvent malheureusement trop facilement se déplacer. Cette orientation est facilitée par la présence, dans certains échantillons, de couches variant d'épaisseur et de couleur, mais toutes parfaitement parallèles l'une à l'autre, et indiquant par cela même l'exacte direction de la coupe. Les fig. 1-4 de la planche IV représentent des coupes faites dans les deux directions, et feront mieux comprendre que toute description ce que je viens de signaler.

Les fig. 5-6 sont des reproductions de coupes faites sur le calcaire de Sendai (Japon). Ici,

PSEUDO-RAPHIDÉES

Grammatophora serpentina; Ehr.
Rhabdonema arcuatum, Kütz.
Surirella striatula, Turp.
Nitzschia sigma, W. Sm.
 — marginulata, Grün.

Campylodiscus Ralfsii, W. Sm.
 — Thuretii, Breb.

CRYPTO-RAPHIDÉES

Melosira sulcata, Kütz.
Actinoptychus undulatus, Ehr.
Coscinodiscus minor, Ehr.

Sur quelques espèces nouvelles ou peu connues

Par M. P.-T. Cleve

(Descriptions faisant suite à celles données page 58)

Achnanthes (Heteroneis) Lilljeborgii Cl., n. sp.

(Pl. III, fig. 19-20.)

Lancéolée, obtuse. Longueur, 0,017 à 0,046 mm. Largeur, 0,008 à 0,01 mm. — *Valve supérieure* assez robuste, à aire axiale lancéolée, mesurant $\frac{1}{3}$ de la largeur de la valve, portant de grosses granulations éparses. Côtes 8 ou 9 en 0,01 mm., légèrement radiées, non ponctuées. — *Valve inférieure* mince, à aire axiale étroite. Stries 12 en 0,01 mm., radiées au centre, dont quelques-unes plus courtes entre les autres, parallèles vers les extrémités.

A. Lilljeborgii Grün. Bot. Centralbl. 1881, p. 62. — Cleve Marine Diatoms, nos 101, 102, 311.

Hab. : Marin, Grip en Norvège, Ile de Bréhat (Côtes-du-Nord), Grünow.

Achnanthes (Heteroneis) Americana Cl., n. sp.

(Pl. III, fig. 17-18.)

Longuement elliptique, à extrémités subtronquées. Longueur 0,013 mm. Largeur 0,006 mm. — *Valve supérieure* à aire large, lancéolée. Stries 16 en 0,01 mm., interrompues sur un des côtés. — *Valve inférieure* à air axiale, lancéolée. Stries 17 en 0,01 mm., radiées et se raccourcissant vers le milieu de la valve.

Hab. : Eau douce : Crane Pond (Amérique du Nord).

Cocconeis (Heteroneis) Lagerheimii Cl., n. sp.

(Pl. III, fig. 21-22.)

Elliptique. Longueur 0,02 à 0,028 mm. Largeur, 0,01 à 0,015 mm. — *Valve supérieure* robuste à aire axiale, lancéolée, ornée au centre de deux rangées de grosses perles. Stries non ponctuées, les deux médianes de l'un des côtés formant par leur réunion un fer à cheval. — *Valve inférieure* mince, à ligne médiane droite. Aire centrale se combinant aux aires latérales, assez larges et lunaires. Stries fines 25 en 0,01 mm.

Hab. : Eau douce : Equateur (région tropicale).

Navicula Herrmanii Reichelt, n. sp.

(Pl. IX, fig. 1.)

Valve lancéolée, souvent rostrée, à extrémités obtuses. Longueur, 0,09 mm. Largeur, 0,023 mm. Ligne médiane droite. Aire axiale distincte, linéaire, un peu dilatée vers le nodule central. Stries 12 (au milieu) à 14 (aux extrémités) en 0,01 mm., légèrement radiées, presque parallèles aux sommets, composées de perles distinctes, au milieu 10, en 0,01 mm., dans les stries terminales 12 en 0,01 mm., disposées en rangées longitudinales ondulées. Au bord même de la valve, les stries sont interrompues par une dépression étroite et canaliculaire.

Hab. : Eau douce : Breiten Busch en Bohême, fossile (tertiaire).

Cette espèce se trouve assez abondante dans le dépôt de Breiten Busch, examiné par M. Reichelt (Berichte der Naturforschenden Gesellschaft zu Leipzig, 1892-93, page 67), dépôt intéressant qui contient, entre autres espèces nouvelles, le beau *Gomphopleura nobilis* Reichelt. Le nom de *N. Herrmanii* a été donné par M. Reichelt sur une préparation, qu'il a bien voulu me communiquer. C'est une espèce fort remarquable à cause de la ligne du bord de la valve, caractère peu apparent sur les exemplaires parfaits, mais bien visible sur les fragments, qui se trouvent en abondance dans le dépôt. Il n'y a pas, que je sache, des *Navicula* d'une structure pareille, si ce n'est le *Navicula decora* et le *Nav. interlineata* Grove and Sturt, tous les deux marins d'Oamaru.

Navicula guatemalensis Cl. et Grove, n. sp.

(Pl. IX, fig. 2.)

Valve allongée, lancéolée, à sommets obtus. Longueur, 0,115 mm. Largeur, 0,018 mm. Ligne médiane droite, bordée d'une aire axiale étroite; ses fissures terminales courbées dans la même direction. Stries transversales et longitudinales; les stries transversales parallèles, 11 en 0,01 mm.; les stries longitudinales, 23 en 0,01 mm.

Hab. : Eau douce : Guatemala, fossile (coll. Grove).

Cette espèce appartient à la section que j'appelle *Nav. orthostichæ*, qui est caractérisée par des stries transversales et longitudinales droites, se croisant à angle droit. C'est la plus rapprochée du *Nav. cuspidata*, qui en diffère par la forme et par une striation plus fine.

Navicula delicatula Cl., n. sp.

(Pl. IX, fig. 3.)

Valve étroite, presque linéaire, un peu élargie au milieu, à sommets capités. Longueur 0,065 mm. Largeur, 0,005 mm. Ligne médiane à pores terminaux à quelque distance de l'extrémité. Striation non observée.

Hab. : Marin : Fiskebaekskil, Bohuslän, Suède.

Cette espèce ressemble, par sa forme, au *Nav. scopulorum*, mais elle est beaucoup plus petite que cette dernière, dont la striation est assez grossière. La striation de notre espèce est d'une grande délicatesse; je n'ai pu l'observer.

Navicula occidentalis Cl., n. sp.

(Pl. IX, fig. 4.)

Valve lancéolée à sommets un peu rostrés. Longueur, 0,04 à 0,065 mm. Largeur, 0,015 mm.

Aire axiale distincte, un peu élargie au milieu. Stries 13 en 0,01 mm., radiantes jusqu'aux sommets, distinctement ponctuées de perles, 16 en 0,01 mm., disposées en séries ondulées longitudinales.

Hab. : Eau douce : Oregon, Pitt River, fossile (Grove Coll.)

Caloneis bohemia Cl., n. sp.

(Pl. IX, fig. 5.)

Valve allongée, à bords très peu convexes et à sommets subrostrés obtus. Longueur 0,055 mm. Largeur, 0,01 mm. Aire axiale assez large, dilatée au milieu en un fascia assez large atteignant les bords. Lignes longitudinales distinctes. Stries presque parallèles, 20 en 0,01 mm.

Hab. : Eau douce : Dépôts de Breitenbuch (Bohême).

Cymbella amphioxys (Kütz.? Grün.) Cl.

(Pl. IX, fig. 6.)

Valve presque symétrique, étroite, linéaire lancéolée, à sommets subrostrés. Longueur 0,07 mm. Largeur, 0,007 mm. Ligne médiane presque centrale. Aire axiale très étroite. Aire centrale indistincte. Stries 17 en 0,01 mm., au milieu légèrement radiantes, puis parallèles, convergentes dans les sommets. Ponctuation des stries indistincte.

Hab. : Eau douce : Degernas (Suède), fossile.

Cette espèce, qui se trouve en assez grande abondance dans le n° 273 des Diat. Cleve et Möller, a été déterminée par Grünow comme étant le *Cymbella naviculacea*, var. *amphioxys* (*Nav. amphioxys* Kütz.??). Notre forme diffère trop du *C. naviculacea* pour être considérée comme une variété de cette espèce. Quant au *Nav. amphioxys* de Kütz. Bac., la figure est trop peu détaillée pour servir à une identification.

Cymbella punctifera Cl., n. sp.

(Pl. IX, fig. 7.)

Valve cymbiforme, à extrémités tronquées. Longueur, 0,13 mm. Largeur 0,02 mm. Ligne médiane arquée, à fissures terminales rétroflexuées. Aire axiale étroite, linéaire, s'élargissant subitement autour du nodule médian en une aire centrale orbiculaire, dont le milieu est occupé par un stigma. Stries 8 en 0,01 mm., un peu plus rapprochées vers les extrémités, radiantes dans les extrémités, distinctement ponctuées par des perles, 15 en 0,01.

Hab. : Eau douce : Oregon, fossile.

Cette espèce ressemble beaucoup au *C. tunida* Bréb., dont elle diffère par le stigma central sans fissure, comme chez la *C. mexicana*.

Tropidoneis (Plagiotropis) prohodicea Cl., n. sp.

(Pl. IX, fig. 8, 9.)

Valve lancéolée, rostrée. Longueur, 0,075 à 0,085 mm. Largeur, 0,018 mm. Ligne médiane médiocrement excentrique, à pores centraux petits et approximiés. Aile unilatérale, à quelque

distance de la ligne médiane. Stries 16 ou 17 en 0,01 mm., transversales, à ponctuation extrêmement fine.

Hab. : Eaux saumâtres : Cameroon (Afrique) (Coll. M. Dusén).

Cette espèce se trouve en abondance dans le n° 538 des types de Tempère et Peragallo. J'ai cru tout d'abord que c'était une forme du variable *T. lepidoptera*, mais les différences sont trop grandes pour que je puisse maintenir cette opinion. La figure 8 représente un frustule entier, qui repose sur la carène et l'aile. On voit que la forme que A. Schmidt a figurée dans son Atlas, planche XL, figure 15, sous le nom de *Amphora munda*, n'est qu'une frustule de quelque espèce de *Tropidoneis*, qu'il est impossible de déterminer, mais qui est probablement lié au *T. prosboscidea*.

Amphiprora Dusenii Cl., n. sp.

(Pl. IX, fig. 10, 11.)

Frustule mince, fortement contracté au milieu, à segments presque orbiculaires. Longueur, 0,13 mm. Largeur, 0,11 mm.; à la constriction, 0,07 mm. Zone connective plissée et finement striée en travers; stries 17 en 0,01 mm. Valve très élevée et comprimée, sans ligne de jonction. Stries 12 en 0,01 mm. (près de la ligne médiane), courbées et au milieu (entre les nodules terminaux et le nodule central), alternantes, plus longues et plus courtes. Vers la ligne médiane, les stries sont ponctuées par des perles espacées, 8 en 0,01 mm.

Hab. : Eaux saumâtres : Cameroon (Dusén).

Cette espèce remarquable se rencontre rarement dans le n° 538 de Tempère et Peragallo. On la voit, malgré sa grandeur, avec difficulté, à cause de la transparence de la valve.

Amphora Astuarii Cl., n. sp.

(Pl. IX, fig. 12, 13.)

Frustule à sommets largement tronqués et à bords convexes. Longueur, 0,005 mm. Largeur, 0,03 mm. Zone non striée, plissée de quatre ou cinq divisions longitudinales. Valve lunaire, à bord dorsal assez courbé et à bord ventral convexe au milieu. Ligne médiane arquée, située à une distance remarquable du bord ventral. Aire axiale large, souvent dilatée autour du nodule central. Stries de la partie dorsale apparemment non ponctuées, 14 en 0,01 mm., non interrompues par une ligne longitudinale. Partie ventrale portant une série de stries courtes, 17 en 0,01 mm.

Hab. : Eaux saumâtres : Cameroon (Afrique) (Dusén).

Cette espèce, qui est remarquable par la largeur de sa partie ventrale, me paraît appartenir à la section de l'*Amphora veneta*.

Denticula? Dusenii Cl., n. sp.

(Pl. IX, fig. 14.)

Valve lancéolée, aiguë. Longueur, 0,05 mm. Largeur, 0,008 mm. Côtes transversales fortes, 7 en 0,01 mm., alternant avec des taches mal définies, formant une seule série entre les côtes.

Hab. : Eaux saumâtres : Cameroon (Afrique) (Dusén).

Cette espèce se trouve en abondance dans le n° 538 des types de Tempère et Peragallo. La nature des taches arrondies et mal définies qu'on voit entre les côtes, m'est inconnue. Elles paraissent appartenir à une couche interne. Je n'ai pu découvrir la ponctuation fine qu'on trouve sur les valves des vrais *Denticula*. La forme la plus rapprochée de *Dent. Dusenii* que je connaisse, est le *Cymatopleura marina* Lewis (Proc. Acad. de Philadelphie, 1861, p. 63, pl. 1, fig. 4), ou *Denticula? Antillarum* Cl. et Grün (Cl. Diat. from the West Indian Archipelago, p. 14, fig. 26, 1878). Cette forme qu'on trouve le long des côtes orientales de l'Amérique, de New-York jusqu'aux Antilles, a des côtes plus écartées et, entre les côtes, des taches irrégulières. Le *Fragilaria antarctica* Schwartz (Sitzungsberichte der Ges. naturforschender Freunde Berlin, 1877), qui se trouve en abondance dans les n°s 183 et 207 des Diatomées de Cleve et Möller, ressemble par sa forme au *D. Dusenii* mais il en diffère par les deux séries de perles alternantes, qui se trouvent entre les côtes. *Odontidium marinum*, Grün. (Verh. 1862, p. 338, pl. VIII, fig. 23), paraît aussi liée à notre espèce, mais la description et les figures ne sont pas assez détaillées pour en permettre l'identification. Peut-être le *Terebraria kerguelensis* O'Meara (Linn. Soc. J. Bot., vol. XV, p. 56, pl. 1, fig. 4), représente-t-il une forme analogue à celle mentionnée plus haut.

Bibliographie et Correspondance

Synopsis of the Naviculoid Diatoms, by P.-T. Cleve. Part. I with 5 plates. Chez P.-A. Norstedt et Söner, Stockolm. 1894. — La première partie de cette très utile et très intéressante monographie peut être obtenue dès à présent, chez MM. Norstedt et Söner, éditeurs à Stockolm, au prix de 16 fr. 70, franco de port.

Tous les diatomistes seront certainement unanimes à féliciter l'auteur d'un travail aussi considérable et, je dois le dire, aussi bien compris que celui dont nous avons la première partie sous les yeux. Seul, un savant et patient observateur comme l'est M. Cleve pouvait le mener à bien.

Voici ce que M. le professeur J. Brun m'écrit à ce sujet :

« Ce nouveau travail de Cleve que j'ai reçu dernièrement est vraiment fait avec un esprit de discernement remarquable. Il a parfaitement bien groupé ces *navicules*. J'ai pu m'en convaincre par un essai que j'avais fait de grouper les formes qu'il a nommées *Trachyneis*, et cette partie de son travail coïncide juste avec mes observations. J'espère que les nouveaux noms de genres qu'il donne seront adoptés. »

Je suis absolument de l'avis de notre savant collaborateur et j'entretiens le même espoir, car, réellement, le genre *Navicula* et quelques autres genres voisins étaient par trop hétérogènes et demandaient à être divisés, ainsi que le travail de M. Cleve nous le présente.

Ce travail, ainsi que son titre nous l'apprend, est écrit en anglais.

La deuxième partie doit paraître très prochainement.

Biologische Station am Plöner See. Holstein. — M. le Dr Otto Zacharias qui dirige les observations microscopiques relatives à la faune pélagique et au *Plankton* des lacs de Plöen, a publié dans le deuxième bulletin de cette année du *Biologischen Centralblatt*, des observations très intéressantes sur les différentes espèces de Diatomées qui habitent ces lacs; ainsi que sur leur abondance relative suivant les saisons. La liste complète des Diatomées pélagiques de ces lacs et

celles des espèces du Plankton sera publiée plus tard. Cette liste doit être établie avec l'aide de M. le comte de Castracane, pour le grand lac de Plœn, et avec l'aide de M. le professeur J. Brun, pour le petit lac dont la richesse est remarquable.

Le même bulletin donne la description et les dessins de quatre espèces d'eau douce nouvelles de ces lacs. Ce sont : *Melosira Zachariwsi* Cast. ; *Attheya Zachariwsi* J. Brun ; *Stephanodiscus Zachariwsi* J. Brun, et *Rhizosolenia longiseta* O. Zachar. — M. Zacharias cherche aussi à établir la quantité de silice que certaines espèces (notamment les *Melosira*) s'assimilent et séparent de l'eau, pour faire ensuite partie du Plankton. Le poids de cette silice a été calculé comparativement à la surface de la masse de l'eau de ces deux lacs. Sur trente-deux kilomètres carrés de surface, les *Melosira* fourniraient, à elles seules, trente-neuf mille quintaux de silice par an dans le Plankton. Nous donnerons là-dessus une notice plus complète lorsque tous les travaux entrepris seront terminés.

Les nos 48 et 49 de l'Atlas du Rev. Ad. Schmidt qui viennent de paraître, remplissent une lacune qui depuis longtemps se faisait sentir. Les huit planches qu'ils comportent représentent un grand nombre de *Cocconeis* qui jusqu'ici étaient restés douteux et sans noms.

La grande habileté, comme dessinateurs, de MM. Ad. Schmidt et J. Brun, et la perfection de la reproduction, nous permettent d'apprécier, sans le secours d'aucune description, les différences ainsi que les détails de structure qui ont valu à chacune des espèces représentées d'être distinguée spécifiquement. Naturellement, ceux que l'accroissement des espèces nouvelles attriste, auront encore une bonne raison de désespérer, car il ne s'en trouve pas moins de soixante et quelques, dans ces huit planches seulement. Je serais curieux de savoir ce qu'ils eussent fait s'ils avaient entrepris eux-mêmes ce travail !

Studies in the Biology of The Diatoms. — The Diatoms considered as a Protozoan, by K. M. Cunningham (*The American Monthly Microscopical Journal*, n° 7, July, and n° 8, August, 1894). Dans les deux articles précités, l'auteur tente, par une série de démonstrations et d'expériences, de prouver que les Diatomées appartiennent, non au règne végétal, mais bien au règne animal, aux Protozoaires ! c'est-à-dire qu'il nous ramène au temps où l'incertitude était grande concernant la place que devaient occuper ces organismes dans la nature. M. Cunningham parviendra-t-il à ramener cette vieille question de la nature animale des Diatomées sur le tapis ? j'en doute !

Ces deux articles sont certainement très intéressants à lire, mais je n'y ai rien trouvé qui soit de nature à démontrer autrement que cela a déjà été entrepris et d'une façon irréfutable, que les Diatomées étaient des animaux !

J. T.



Le Directeur-Gérant : J. TEMPÈRE.

Tours, Imp. PAUL BOUSREZ. — Spécialité de Publications.



Planche IX

Fig. 1	<i>Navicula Herrmanii</i> Reichelt, n. sp.	Gross.	1.000	Page.	144
— 2	<i>Navicula guatemalensis</i> Cl. et Grove, n. sp.	—	500	—	144
— 2 a	— Portion de la valve.	—	1.000	—	144
— 3	<i>Navicula delicatula</i> Cl., n. sp.	—	1.000	—	145
— 4	<i>Navicula occidentalis</i> Cl., n. sp.	—	1.000	—	145
— 5	<i>Caloneis bohémica</i> Cl., n. sp.	—	1.000	—	145
— 6	<i>Cymbella amphioxys</i> (Kütz ? Grün). Cl.	—	1.000	—	145
— 7	<i>Cymbella punctifera</i> Cl., n. sp.	—	500	—	146
— 8-9	<i>Plagiotropis proboscidea</i> Cl., n. sp.	— {	8.500 9.1000	—	146
— 10-11	<i>Amphiprora Dusenii</i> Cl., n. sp.	— {	10.500 11.1000	—	146
— 12-13	<i>Amphora æstuarii</i> Cl., n. sp.	—	1.000	—	147
— 14	<i>Denticula Dusenii</i> Cl., n. sp.	—	1.000	—	147

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NOTES

ON SOME

ATLANTIC PLANKTON-ORGANISMS

BY

P. T. CLEVE

WITH VIII PLATES

COMMUNICATED 1900, APRIL 11

STOCKHOLM

KUNGL. BOKTRYCKERIET. P. A. NORSTEDT & SÖNER
1900

During the years 1898 and 1899 a large number of samples of plankton have been collected from all parts of the Atlantic Ocean by Dutch, English and French ocean liners, by some wessels of the Dutch and Swedish navy, by whalers in the Arctic Sea and besides, at some stations, viz. at Vestmanna ö (S. Iceland), the Färöes and the Azores. Most samples of plankton were collected at the same time as the temperature of the sea was determined and samples of water for the determination of the salinity preserved. Professor S. O. PETTERSSON and M. GUST. EKMAN have charged themselves with the purely hydrographical work and left to me the examination of the plankton. In examining these samples I found a number of forms, which seem to me to be new to science, and some, the determination of which seems to me to be uncertain for the want of figures in the litterature. As I intend to publish in a future work my notes on the seasonal distribution of the Atlantic plankton-organisms as well as an account of the mean and extreme temperature and salinity for every species, I wish here to publish my drawings of some new or doubtful forms.

Although the officers on many of the ocean liners and government wessels have assisted us in a most liberal way for this extensive hydrographical and biological survey of the Atlantic, still considerable expenses have been necessary. For covering these we have obtained from the fund »Lars Hiertas Minne» the sum of 7,000 kronor.

I. COPEPODA.

Acartia macropus. N. Sp.

Plate I. Fig. 1—7.

Male. Length of cephalothorax 0,88, of abdomen 0,3, of furca 0,05, of the longest seta of the furca 0,4. Breadth of cephalothorax 0,24 millim.

Lateral angles of the last segment of the thorax rounded; margin of the last segment smooth, without small spines.

Rostral filaments present.

R. e. 2 of the right fifth foot longer than broad; *R. e. 3* elongate, with a very small terminal claw.

Female. Length of cephalothorax 0,88, of abdomen 0,25, of furca 0,95, of the longest seta of the furca 0,4 millim. Breadth of cephalothorax 0,25 millim.

Last segment of the thorax with two small finger-like processes. Its margin not spinous.

The genital-segment of abdomen three times longer than the second segment, which is as long as the third one. The longest seta of the furca exceeds the abdomen in length. All setae of equal thickness. Furca nearly twice as long as broad.

Rostral filaments present.

Cephalothorax three times longer than broad.

Fifth pair of feet: *R. e* very short, uniting with *B. 2*; its interior margin denticulate.

This fine species is most akin to *A. verrucosa* THOMPS., but is easily distinguished by the fifth pair of feet both of the male and the female.

Habitat. The Azores, rare in August and September 1898. *Temperature:* 21,2 to 21,4. *Salinity:* 36,25 to 36,28 p. m.

***Corycaeus longicaudis* DANA.**

Plate I. Fig. 8—11.

Male. Abdomen one-jointed, twice as long as the furca. Branches of the furca at least 7 times as long as broad.

Dimensions: total length 0,8, length of cephalothorax 0,5, of abdomen 0,3, of furca 0,1 millim.

The male of this species has not been described in GIESBRECHT'S »*Systematik und Faunistik der Pelagischen Copepoden*». It is common in the whole tropical Atlantic.

***Euchirella rostrata* CLAUS.**

Plate II. Fig. 1—12.

Male. Head without crista, but with a subulate rostrum. Fifth foot six times as long as its *B. 2*. Margin of its *R. e. 2* not denticulate and of the *R. e. 3* smooth. *R. e.* of the posterior antennae twice as long as *R. i.* No triangular scales on the inside of *B. 1* of the 4th foot.

Length of cephalothorax 2, of abdomen 0,5, of furca 0,68 millim.

The male has not been described by GIESBRECHT'S in the *Systematik und Faunistik der Pelagischen Copepoden*, but he mentions as questionable synonyme *Euchæta Hessei* BRADY (Chall. Rep. Vol. VIII pag. 63). A comparison of my fig. of the fifth foot with the drawing of BRADY proves that *Euchæta Hessei* is exactly the same as *Euchirella rostrata*.

Some few specimens of the male were found together with several females in December 1898 off the Canaries.

Oucea subtilis GIESBR.

Plate III. Fig. 1—11.

Male. Branches of the furca 5.7 as long as broad, closely approximate; anal-joint as long as broad. *R. i.* of the feet not ending in conical processes.

Total length: 0.4 (of the female 0.6); length of cephalothorax 0.29 , of abdomen 0.1 , of furca 0.02 ; breadth of cephalothorax 0.1 millim.

This species has been found in the eastern Atlantic from 32° S. to 52° N. The male was found together with numerous females in a collection from the vicinity of Uschant.

II. **RADIOLARIA.****Acanthosphæra trichophora.** N Sp.

Plate V. Fig. 3.

Shell thin-walled, with irregular, polygonal meshes, 4 on the radius. Bars thin, thread-like. Spines few, hair-like, flexuose, twice as long as the radius.

Diameter of the shell 0.06 . Meshes 0.004 to 0.012 millim.

Atlantic, November 1898, 50° N. 33° W.

Actinomma(?) Sol N. Sp.

Plate V. Fig. 2.

Radial proportion of the three shells $1:2.5:9$. Cortical shell thick-walled, with circular, regular, six-lobed pores, as broad as the bars. At each nodal-point is a bristle-like spine, half as long as the radius, thus every pore surrounded by a corona of six bristles.

Diameter of the outer shell 0.09 , of the cellules 0.001 millim.

Found in *January* 1899 at 45° N. 49° W. in styli- and tricho-plankton intermingled. *Temperature* 12 . *Salinity* 35.54 p. m.

Owing to the thickness of the cortical shell, the interior shells were visible merely as faint shadows, so I am not quite convinced whether the shells are 3 or 2. If the latter be the case, the species belongs to *Haliomma* and is then nearest akin to *H. horrida*.

Amphihymenium elegans. N. Sp.

Plate V. Fig. 1.

Arms equal, more than twice as long as broad, 5—6-jointed; joints increasing in breadth towards the blunt ends. Their axis a straight line. Patagium enveloping the arms with the exception of the distal ends.

Length 0,24; breadth 0,09 millim.

Found at 25° N. 52° W. *December* 1898. *Temperature* 24,2. *Salinity* 37,17. *Desmoplankton*.

Anthocyrtium anthemis HÆKL.?

Plate III. Fig. 12.

As there exists no figure of this species, I am somewhat uncertain about the identification. I have seen a single specimen only, which was found alive at 63° N. 2° E. (March 1898), where it occurred together with some species of the tricho-type. The description in HÆCKEL's Monograph (Chall. Rep. pag. 1273) agrees well with my specimen, but the dimensions are somewhat dissimilar. On my specimen the cephalis was 0,02 millim. long and broad and thorax 0,05 long, 0,1 broad.

HÆCKEL's species was found in the abysmal depths of the northern Pacific. If my specimen really belongs to HÆCKEL's species, the occurrence above the deep »Norske Rende» is a fact of considerable interest.

Challengeron brevispina. N. Sp.

Plate III. Fig. 14, 15.

Shell ovate, scarcely compressed, with a single, very short conical spine on the aboral pole. Peristome with a single truncate tooth of the same length as the aboral spine. Structure: quincuncially disposed alveoli, about 4 in 0,01 millim.

Length 0,06; breadth 0,04 millim.

I found a single specimen only in a sample from 63° N. 2° E. (March 1898). *Temperature* 6,7. *Salinity* 35,10.

Clathrocanium minutum. N. Sp.

Plate IV. Fig. 9.

Horn of the cephalis fenestrated. Cephalis hemispherical with small subquadrate pores and a horn of 1½ the length, surrounded by an irregular network. Length of the two joints 3:5; breadth 1:2. Thorax with an irregular network; its ribs united by a circular, irregularly latticed ring. Peristome smooth.

Dimensions: cephalis 0,024 long, 0,04 broad; thorax 0,05 long and 0,08 millim. broad. Found at 21° S. 36° W. (1898 October). *Temperature* 22. *Salinity* 37,21. *Desmo-plankton*.

Dictyocephalus cylindricus. N. Sp.

Plate IV. Fig. 10.

Mouth not constricted, without peristome. Shell thick-walled, with distinct collar stricture. Length of the two joints 4:7, breadth 9:11. Cephalis nearly spherical, large, with unequal, circular pores, and rough of numerous, short spines. Thorax cylindrical, with rounded, unequal pores.

Length of the shell 0,1 millim.

Found at 15° N. 71° W. (February 1898). *Temperature* 27. *Desmo-plankton*.

This species differs from *D. hispidus* EMB. in the cylindrical, not funnel-shaped, thorax and from *D. obtusus* by the spiny cephalis and the unequal pores.

Dictyoceras neglectum. N. Sp.

Plate IV. Fig. 5.

Shell with two distinct strictures. Length of the three joints 1:3,5:1,5, breadth 1:3:4. Cephalis almost spherical, with a strong horn, nearly twice as long, and small irregular circular pores. Thorax campanulate, with three small triangular lattice wings. Cellules subregular, hexagonal, quincuncially disposed, 2,5 in 0,01 millim., similar on the thorax and abdomen.

Length of the three joints: 0,02:0,05:0,03; breadth 0,02:0,06:0,08 millim.

Tropical Atlantic 11°—33° N. 32°—76° W. Mean *temperature* 25,1. Mean *salinity* 36,04. *Desmo-plankton*.

Euphysetta pusilla. N. Sp.

Plate III. Fig. 16.

Shell egg-shaped, without apical horn; structure double: longitudinal lines 11 in 0,01 millim., and very small alveoli, quincuncially arranged, 19 in 0,01 millim. Small feet subulate; odd foot half as long as the shell, not branched.

Length 0,06; breadth 0,04 millim.

Very rare at 45° N. 49° W. (January 1899). *Temperature* 12. *Salinity* 35,54.

Haliomma echinosphæra. N. Sp.

Plate V. Fig. 5.

Cortical shell thick-walled, 2¹/₂ times broader than the medullary shell, with regular, circular, hexagonally framed pores as broad as the bars. The outer openings of the pores are sixlobed, lobes ending in short, conical spines.

Diameter of the outer shell 0,1, of the interior 0,04, of the meshes 0,01 millim.

Very rare at 45° N. 49° W. (1899 January). *Temperature* 12. *Salinity* 35,54.

Similar to *H. melitomma*, but smaller, with thicker bars and smaller meshes. The thickness of the cortical shell prevented all examination of the medullary shell.

***Haliomma irregulare*. N. Sp.**

Plate V. Fig. 4.

Pores of the cortical shell irregular, rounded, of different size and form. Spines stouter main-spines and smaller by-spines, the former $\frac{1}{6}$ of the radius. By-spines scattered at intervals. Cortical shell thin-walled, 3 times as broad as the medullary shell. Pores irregular rounded, 3 to 9 times as broad as the bars. Medullary shell with rounded, smaller pores.

Diameter of the outer shell 0,22, of the medullary shell 0,07, of the meshes 0,01 to 0,03 millim.

Very rare at 45° N. 49° W. (January 1899). *Temperature* 12. *Salinity* 35,54.

***Haliomma spinulosum* var. *)**

Plate V. Fig. 7.

I have met with specimens having *two* concentric, exterior shells with very wide irregular meshes and thread-like bars. The interior shell had, as usually, very regular hexagonal meshes. There is thus no other difference between this form and the normal, than that the variety has *three*, in stead of *two*, shells and should therefore be classified as *Echinomma*. It seems as were the number of exterior shells variable, and it may be possible that *Arachnosphaera* comprises forms with an increased number of shells, especially as the interior shell of *Haliomma spinulosum* is similar to those of *Arachnosphaera myriacantha* and *A. oligacantha*.

***Heliosphaera minuta* CL.**

Plate VI. Fig. 2.

Thick-walled, 5 to 6 times as broad as the meshes. Pores regular, all equal, hexagonally framed. Main-spines three sided pyramidal, few, $1\frac{1}{2}$ times as long as the radius. By-spines short, acute, arising from the nodal points of the meshes.

Diameter 0,05 to 0,07; pores 0,006; bars 0,006, main-spines 0,02 to 0,06 millim.

Rare at 41° N. 21°—23° W., 49° N. 18° W., 62° N. 11° W. (March 1898) and 17° N. 71° W. (August 1898). *Temperature* 11,7, mean of 4 observations, max. 14,9, min. 8, exceptionally 27,2. *Salinity* 35,63, mean of 3 obs., max. 35,87, min. 35,37.

*) The same form has been figured by JØRGENSEN (Bergens Museum Aarbog 1899, N. 6, Pl. III, fig. 18) as *Arachnosphaera dichotoma*.

Hexacontium armatum. N. Sp.

Plate VI. Fig. 5.

Cortical shell thick-walled, with regular, honeycomb-like network. Meshes funnel-shaped, with circular inner and hexagonal outer aperture, as broad as the bars, about 7 on the radius. Main spines strong, three-sided prismatic, as long as the radius of the outer shell. By-spines at every nodal point, short, bristle-like. Radial proportion of the three shells 1 : 3 : 8.

Diameter 0,11; length of the main spines 0,06; basal breadth of the main spines 0,02; diameter of the meshes 0,01 millim.

Rare at 56° N. 17° W. (November 1898). *Temperature* 11,6. *Salinity* 35,27. *Styli-plankton*.

Nearest akin to *H. favosum*, from which it differs by the smaller meshes and the stronger main spines.

Hexacontium hostile. N. Sp.

Plate VI. Fig. 4.

Radial proportion of the three shells 1 : 3 : 9. Outer shell thick-walled, with irregular, rounded pores, 1 to 5 times as broad as the bars. Main spines strong, three-sided prismatic, slightly spirally twisted, twice as long as the radius. By-spines bristle-like as long as the diameter of the pores.

Diameter of the outer shell 0,09, of the middle 0,03, of the inner 0,009; diameter of the pores 0,006 to 0,016; length of the main spines 0,03, their basal breadth 0,024 millim.

Rare at 56° N. 23° W. (November 1898). *Temperature* 10,8. *Salinity* 35,32.

Hexacontium setosum H_KL.?

Plate V. Fig. 6.

This species (Chall. Rep. Radiol. pag. 198) has not been figured, of which reason the identification is doubtful. The radial proportion of the three shells 1 : 4 : 7. Diameter of the outer shell 0,14, of the middle 0,04, of the inner 0,02; diameter of the cortical pores 0,01 to 0,03; breadth of the bars 0,004; length of the main spines 0,06 millim.

Rare at 45° N. 49° W. (January 1899). *Temperature* 12. *Salinity* 35,54.

My specimen occurred in styli- and trichoplankton intermingled.

Hexastylus nobilis. N. Sp.

Plate VI. Fig 1.

Shell thick-walled. Pores regular circular, hexagonally framed, 10 on the radius. Six main spines triangular pyramidal, with straight edges, as long as the radius; their

bases as broad as two meshes. By-spines bristle-shaped, arising from all nodal points of the meshes, half as long as the main spines.

Diameter of the shell 0,16; length of the main spines 0,06 millim. Meshes 9 in 0,01 millim.

Very rare at 19° N. 60° W. (1898 November). *Temperature* 27,5. *Salinity* 35,22.

Lampromitra erosa. N. Sp.

Plate IV. Fig 2—3.

Shell flat conical, with slight collar stricture. Length of the two joints 1:4; their breadth 1:3. Cephalis hemispherical, with a horn of 1½ the length and with irregular rounded pores of unequal size. Thorax with large rounded pores of unequal size. Its margin with distant, frequently double teeth.

Cephalis 0,02 long, 0,03 broad; thorax 0,06 long, 0,16 millim. broad.

Very rare at 45° N. 49° W. (January 1899). *Temperature* 12. *Salinity* 35,54.

Psilomelissa longispina. N. Sp.

Plate IV. Fig. 4.

Shell smooth, with strong collar structure. Length of the two joints 4:3, breadth 1:1. Cephalis large ovate, with numerous scattered circular pores of unequal size, larger and more crowded towards the collar stricture. Thorax short cylindrical, with scattered circular pores. From the collar stricture there arise three divergent spines of equal thickness throughout their whole length, as long as the cephalis.

Cephalis 0,04 long, 0,03 broad; thorax 0,028 long, 0,03 millim. broad.

Western tropical Atlantic (1898 January at 32° N. 74° W.; May at 41° N. 51° W.; December at 18° N. 67° W. *Temperature* 19 to 26,8. *Salinity* 34,88 to 36,01.

Quadrilonche crux. N. Sp.

Plate IV. Fig. 1.

Four equatorial spines with apophyses, the other needle-shaped. Equatorial spines with conical ends, gradually narrowed towards the centre, winged along their whole length, except at the conical end.

Length of the cross 0,16 millim.

Western tropical Atlantic, sparingly from 26° S. to 36° N. *Temperature* 25,4, mean of 13 obs., max. 28, min. 21,7. *Salinity* 36,40, mean of 8 obs., max. 37,43, min. 34,88.

Sethoconus crinitus. N. Sp.

Plate III. Fig. 13.

Cephalis subspherical large, with numerous bristle-shaped horns and close polygonal meshes of different size. Collar constriction deep. Thorax conical, with straight outline, gradually increasing in breadth towards the wide open mouth. Pores of the thorax similar to those of the cephalis, polygonal and of different size, much broader than the thread-like bars.

Cephalis 0,03 long and broad. Thorax 0,06 long and broad. Collar constriction 0,02 millim.

Sparingly along the N. coast of S. America and in the Florida current, 7°—41° N. 53°—75° W. *Temperature* 22,4 to 28. *Salinity* 33,88 to 36,56.

Sethocyrtis pyrum. N. Sp.

Plate IV. Fig. 6.

Shell thick-walled, pear-shaped, with slight collar stricture. Length of the two joints 1 : 6, breadth 1 : 4. Cephalis hemispherical, with a small horn of half the length and unequal small pores. Thorax inflated, with circular, regular pores, quincuncially arranged and as broad as the bars. On the nodal points short spines arise. Mouth flat, half as broad as the thorax.

Cephalis 0,012 long, 0,02 broad. Thorax 0,072 long and 0,08 millim. broad.

Very rare at 45° N. 49° W. (January 1899). *Temperature* 12. *Salinity* 35,54.

Spermatogonia antiqua LEUD. FORTM.

Plate III. Fig. 17, 18.

Dr. LEUDUGER FORTMOREL described in 1892 (*Diatomées de la Malaisie. Annales du Jardin botan. de Buitenzorg. Vol. XI pag. 49. Pl. IV, fig. 8*) under the above name an organism from the Malay Archipelago, which he considered as a diatom. The figure has been reproduced in VAN HEURCK's *Treatise on the diatomaceæ* (1896) pag. 541 with the remark »is it a diatom?». This form is by no means rare in the tropical Atlantic and cannot be a diatom. It is a part of an organism, of which I have however seen only alcohol-preserved specimens. The needles, called *Spermatogonia*, are by their arrow-head like ends fastened in groups on a hyaline sack, which encloses, besides a number of smaller granules, a larger cucumber-like body. This body, which treated with soda shows a peculiar structure of longitudinal and transverse lines, reminds of the central capsule of the radiolarians. If so, the hyaline sack should correspond to the calymna. But, on the other hand, there is no radiolaria known, which offers any distant relation to *Spermatogonia*. From the *phæodarian* it differs by the entirely different central capsule. In all cases this form is no diatom, and, if a radiolaria, it belongs to a quite new type.

The range of distribution in the Atlantic is from Rio Janeiro to 56° N., chiefly in the west. *Temperature* 24,₅, mean of 26 obs., max. 28,₄, min. 9,₆. *Salinity* 35,₃₉, mean of 23 obs., max. 36,₄₀, min. 33,₉₃.

Thecoconus junonis HKL. aff.

Plate IV Fig. 8.

I have reproduced in Fig. 8 a drawing of the only specimen I have seen, as it is of considerable interest for its occurrence W. of Norway. It is doubtless akin to *T. jovis* or to *T. junonis*, but does not sufficiently agree with any. It was found in March 1898 at 62° N. 2° E. (temperature 7,₄. Salinity 35,₁₂). The water was very poor in plankton, as the tow-net caught in half an hour some few plankton-specimens only, such as *Coscinodiscus oculus iridis* and several radiolarians, not found at other spots in the Atlantic. *T. junonis* was taken by the Challenger Expedition from great depths east of Japan. *Thecoconus jovis* has been found in the abysmal depths of the central Pacific.

Length of the three joints 1:3,5:2, breadth 1:4:5. Cephalis 0,₀₁₆ long, 0,₀₂ broad. Thorax 0,₀₅ long, 0,₀₈ broad. Abdomen (incomplete) 0,₀₃ long, 0,₁ millim. broad.

Theocyrtis aculeata. N. Sp.

Plate IV. Fig 11.

Shell thick-walled. Length of the three joints 1:2:4; breadth 1:3:3. Cephalis hemispherical, with a strong horn, longer than the cephalis. Thorax slightly inflated. Abdomen cylindrical, with several rows of strong aculei towards the mouth. Pores of the thorax and abdomen of nearly equal form and size, circular, regular, quincuncially disposed, 3 to 4 times as broad as the bars.

Length of the three joints: *a* 0,₀₂₅, *b* 0,₀₆, *c* 0,₁₁; breadth: *a* 0,₀₃, *b* 0,₀₇₆, *c* 0,₀₉. Horn 0,₀₄ millim. long.

Found in November 1898 between 56° N. 17° W. and 48° N. 29° W. *Temperature* 10,₈ to 15. *Salinity* 35,₂₇ to 35,₄₄.

Theocyrtis turris. N. Sp.

Plate IV. Fig. 7.

Length of the three joints 1:3:4, breadth 1:3:3. Pores of the thorax and abdomen of the same form and size. Cephalis small, hemispherical, with some scattered pores and a horn of the same length. Thorax conical; abdomen cylindrical. Pores rounded, or rather subhexagonal, broader than the bars, quincuncially arranged. Length and breadth of the cephalis 0,₀₁, of thorax 0,₀₃. Abdomen 0,₀₄₅ long, 0,₀₅ millim. broad.

Very rare at 45° N. 49° W. (January 1899). *Temperature* 12. *Salinity* 35,₅₄.

Trypanosphaera brachysiphon. N. Sp.

Plate VI. Fig. 3.

Shell a regular sphere. Pores of unequal size; the larger prolonged in a very short tube, with two or three teeth.

Diameter: 0,15, of the larger pores 0,017 millim.

Found very rarely at 56° N. 17° W. (November 1898) and at 41° N. 66° W. (December 1898). *Temperature* 11,6 to 12. *Salinity* 34,60 to 35,25.

III. **DINOFLAGELLATÆ.****Ceratium (tripos var.) arenatum** GOURRET.

Plate VII. Fig. 11.

GOURRET has described (Ann. du Musée d'Hist. Naturelle de Marseille; zool., Vol. I 1883 n:o 8, pag. 25, Pl. II, fig. 42) a form of *C. tripos*, which I consider, although with a some hesitation, to be identical with the Atlantic form.

It is rather common in the tropical Atlantic from 29° S. to 48° N.

Ceratium (tripos var.) arietinum. N. Sp. *)

Plate VII. Fig. 3.

This form, which belongs to the tripos-type, is very constant and could be considered as a distinct species. I have seen it in samples from the Indian Ocean and the Atlantic, chiefly on the area between the Azores, the Engl. Channel and New York. It occurs besides, but sparingly, in the N. Equatorial current, the Antilles current and in the Caribbean Sea. It belongs to the *styli-plankton*.

Ceratium (tripos var.) azoricum. N. Sp.

Plate VII. Fig. 6, 7.

This form is nearly related to the typical *C. tripos*, but differs by smaller size and short apical horn. It occurs round the Azores and W. of the Spanish Peninsula. I have also met with this form in plankton from 25° S. 7° E.

Ceratium (furca var.?) belone. N. Sp.

Plate VII. Fig. 13.

This form, which is evidently nearly akin to *C. furca*, is very rare in the Atlantic and has been found in samples from 10° N. 53° W. and 33°—34° N. 15°—12° W., thus in the western and eastern tropical Atlantic.

*) JØRGENSEN (Bergens Museums Aarbog 1899, N. VI, Pl. II, fig. 11) names this form *Ceratium tripos arcuatum* forma *heterocampta*. JØRGENSEN'S work was not published when this paper was written.

Ceratium contortum GOURRET.

Plate VII. Fig. 10.

This species, akin to *C. tripos*, is too constant for being considered as a mere variety. It has been described by GOURRET in *Annales du Mus. d'Hist. Nat. de Marseille*; zool. vol. I no 8, 1883, Pl. II, fig. 33. SCHÜTT has figured it in *Pflanzenleben d. Hochsee*, pag. 268, VII b., but not named it. It occurs in the Mediterranean, Indian and Pacific. In the Atlantic it is rather common in the tropical parts, E. of S. America and W. of Africa. If a line be traced on the northern hemisphere from the Cape Verde to the Newfoundland Banks the space on the left of this line represents the area of distribution of this species.

Ceratium curvicone v. DADAY.

Plate VII. Fig. 2.

This constant and characteristic form described by v. DADAY (*Termezetrajri füzetek a mus. Hung. Budapestense vulgata* 1887—88, Pl. III, fig. 4, 8, 12, 14) as a variety of *Cer. tripos*, has been figured (without name) in SCHÜTT *Pflanzenleben der Hochsee*, pag. 268, VII a.

I have met with this species in samples from the Red Sea, the Indian ocean and the tropical Atlantic, where it occurs rather common in the Equatorial currents, the Brazil current, the Florida current towards the Newfoundland Banks as well as east thereof between 40°—45° N., in the Sargasso Sea, at the Azores and the Canaries.

Ceratium flagelliferum CL.

Plate VII. Fig. 12.

I have proposed this name in 1899 (*Kongl. Sv. Vetensk.-Akad. Handl.*, Vol. XXXII, no 3, pag. 1, nomen nudum) for a characteristic form of the tropical Atlantic. It has been figured by SCHÜTT (*Pflanzenleben der Hochsee*, pag. 267, fig. 77, V. b, without name) as a form of *Ceratium tripos*. It may possibly be the same as *C. tripos* var. *inflexum* GOURRET, but I dare not identify them. This species is remarkable for the small size of the body and the very long horns, the posterior of which have a characteristic flexure. This species is very common in *desmo-plankton* of the whole tropical Atlantic, from 29° S. to 45° N.

Ceratium(?) hyperboreum. N. Sp.

Plate VIII. Fig. 14.

By the above name I denote a very small, but characteristic dinoflagellate, of which I have not been able to distinguish the tabulation and which possibly may belong to *Peridinium*. The longitudinal axis measures 0,07 and the transverse 0,05 millim. The membrane has a coarse and irregular areolation.

I found this species in samples from Spitzbergen, collected in August 1898 (80° 31' N. 18° 50' E.) and the same month 1899 (80° N. 16° E.). *Temperature* — 0,30 to + 2,42. *Salinity* 25,36 to 33,93. It is thus to be considered as an arctic neritic form.

***Ceratinm paradoxides.* N. Sp.**

Plate VII. Fig. 14.

I propose this name for a form, nearly akin to *C. limulus*. It is characterized by the cellular reticulation of the membrane. I have seen it, but very rarely, in samples from the Newfoundland Banks, the Azores and the Canaries.

***Ceratinm ranipes.* N. Sp.**

Plate VII. Fig. 1.

This rare and remarkable form has been figured by SCHÜTT in *Pflanzenleben der Hochsee*, pag. 267, fig. 79, VIII b. but without name. LEMMERMAN (Abh. Nat. Verein. Bremens. Vol. XVI, Part 2, pag. 346) names it *C. tripos var. digitatum*, but as Schütt has already used the name *digitatum* for another different species, a new name becomes necessary.

This form occurs in the tropical Atlantic, in the Equatorial, Antilles and Florida currents, also round the Azores, or between 12° and 49° N.

***Ceratinm reflexum.* N. Sp.**

Plate VII. Fig. 8, 9.

This form, characterized by the divergency of the posterior horns, of which one is nearly parallel to the apical horn, is very rare and has been seen twice only, viz. at 19° S. 31° W. and 38° N. 47° W.

***Ceratinm (tripos var.?) volans.* N. Sp.**

Plate VII. Fig. 4.

This form is characterized by the straight and very long posterior horns, which proceed in a right angle to the apical horn. They become first towards the distal end somewhat bent towards the apical horn.

This species is common in the tropical Atlantic, and it may be possible that it is the same as *Ceratinm carriense* GOURRET, which I dare not decide without comparing original specimens.

***Ceratinm (tripos var.?) vultur.* N. Sp.**

Plate VII. Fig. 5.

This species, which is characterized by the angular flexure of the posterior horns, occurs frequently in chains. I have found it in samples from the Indian ocean and from the tropical Atlantic between 21° S. and 45° N.

Dinophysis Vanhöffenii OSTENF. *)

Plate VIII. Fig. 3.

Under the name *D. granulata* I have described a small form (Kongl. Sv. Vet.-Akad. Handl., Vol. XXXII, no 3, pag. 39, Pl. IV, fig. 7) from Spitzbergen, where it was found among drift-ice. This form seems to me to be a small variety of a widely distributed arctic species, named by VANHÖFFEN »*D. ovata* Clap & Lachm.» (Grönl. Exp. 1891—93. Vol. II, 1 part, 1897, Pl. V, fig. 7). OSTENFELD (lagttagelser over overfladvandets temperatur, saltholdighet og plankton, 1898, pag. 58) proposed the name *D. Vanhöffenii*, which I accept as it denotes the typical form, and my name a dwarf-form only. This species, which seems to have been confounded with *D. Michailis* (EHB.) AURIV. or *D. rotundata*, is well characterized by its thick, coarsely areolated membrane, the upper part of which scarcely proceeds beyond the girdle. The apical part has frequently some short spines.

I have seen this species in a collection from Jeddo Bay (Japan) and very frequently in specimens from the northern Atlantic, between 81° and 52° N. *Temperature* 5,9, mean of 21 obs., max. 9,8, min. — 0,9. *Salinity* 34,35, mean of 21 obs., max. 35,41, min. 32,03.

Peridinium diabolus. N. Sp.

Plate VII. Fig. 19, 20.

This species has been figured by MURRAY and WHITTING (Trans. Lin. Soc. of London, 2 Ser. Bot., Vol. V, Part 9, Pl. XXIX, fig. 4 b) as a variety of *P. divergens*. It is such a characteristic form that it merits to be considered as a species, remarkable for its small size and the very strong posterior horns. I have found it in samples from the Indian ocean and the Atlantic, where it has been observed from the region of Cape Verde to the coasts of Portugal and near the Azores, besides S. of the Newfoundland Banks and E. of Cape Hatteras. *Temperature* 14,8 to 24. *Salinity* 36 to 36,40. Belongs to the *styli-plankton*.

Peridinium elegans. N. Sp.

Plate VII. Fig. 15, 16.

This species is nearly related to *P. divergens* and has been figured by MURRAY & WHITTING (Trans. Linn. Soc. of London, Ser. 2, Vol. V, part 9, Pl. XXIX, fig. 4 a) as a variety of the named species. It differs from *P. divergens* by larger size (length 0,2, breadth 0,1 millim.), by the absence of teeth at the basis of the posterior horns and by the ends of the girdle not being oblique. The longitudinal axis is slightly oblique to the plane of the girdle.

*) *Dinophysis norvegica* (CLAP. et LACHM.) JORGENSEN (Bergens Museums Aarbog 1899, N. VI., Pl. I, fig. 3—6) and *D. acuminata* JORG. l. c. fig. 7—9.

This species has been found in samples from the Indian ocean as well as from the Atlantic, where it occurs in the tropical part, at least from 21° S. to 47° N. *Temperature* 23,8, mean of 43 obs., max. 28,3, min. 10. *Salinity* 35,84, mean of 40 obs., max. 37,28, min. 32,87. It belongs to *desmo-plankton*.

Peridinium exiguum. N. Sp.

Plate VIII. Fig 5.

This species is also nearly akin to *P. divergens*, but differs in the small size (length 0,05—0,06, breadth 0,04 millim.), the coarse areolation, the serrated posterior horns without basal teeth and in the oblique girdle.

I have found it in samples from the Azores (August 1898) and from the coast of Portugal (June 1898). *Temperature* 21,2. *Salinity* 36,25. It belongs probably to *styli-plankton*.

Peridinium oceanicum VANHÖFFEN.

Plate VII. Fig. 17, 18.

In the »Peridineen der Planktonexpedition» (Pl. XIII, fig. 44) SCHÜTT has figured, as a variety of *P. divergens*, a common atlantic form, which VANHÖFFEN (Grönl. Exp., Vol. II, 2 part, Pl. V, fig. 2) names *P. oceanicum*. The same form was, also in 1898, named by AURIVILLIUS (Kongl. Sv. Vet.-Akad. Handl., Vol. XXX, n:o 3, pag. 96) *Perid. div. var. obliqua*.

It is a very constant, easily recognised form, which I have seen in samples from the Red Sea and the Indian ocean. It occurs in the Atlantic chiefly in the region of the Azores and N. thereof, in the spring across the whole Atlantic, between 40° and 50° N., whence it spreads, during the summer, towards Greenland, into the Irminger Sea and across the Färöe Channel into the North Sea and the Skagerak. *Temperature* 12,9, mean of 32 obs., max. 22, min. 3. *Salinity* 35,45, mean of 28 obs., max. 36,25, min. 34,16. (For the calculation of the means only such samples have been used as contained this form in any abundance) It is a typical *styli-plankton* form.

Peridinium pallidum OSTENF.

Plate VII. Fig. 21, 22.

Under the above name OSTENFELD (Iagttagelser over overfladvandets temperatur, saltholdighed og plankton in 1898, pag. 60, 1899) has distinguished a form nearly related to *P. pellucidum*, but with oblique posterior horns.

It is an *arctic* form, that ranges between 39° and 79° N. *Temperature* 8,5, mean of 45 obs., max. 19,4, min. 0. *Salinity* 34,87, mean of 45 obs., max. 35,97, min. 32,43. It belongs to *tricho-plankton* and to the *northern neritic plankton*.

Phalocroma minutum. N. Sp.

Plate VIII. Fig 10, 11.

Longitudinal axis 0,05, sagittal axis 0,04, transverse axis 0,025 millim. Areolation coarse, 3 to 4 areoles in 0,01 millim.

I have found this small form twice only, viz. at 41° N, 57° W. (July 1899) and at 41° N., 62° W. (August 1899). *Temperature* 22 to 24,4. *Salinity* 33,88 to 36,13.

Steiniella(?) punctata. N. Sp.

Plate VIII. Fig. 4.

This species is characterized by its biconical form, solid membrane and coarse areolation. Longitudinal axis 0,11, sagittal and transverse axis 0,06 millim. A nearly related form has been described by MURRAY & WHITTING (Trans. Linnean Soc. of London, ser. 2, Bot., Vol. V, Pl. XXVI, fig. 4) as *Ceratium biconicum*, which also probably belongs to the genus *Steiniella*.

I have found this form once only in a sample from 48° N., 24° W. (August 1899). *Temperature* 19,4. *Salinity* 35,63. *Styli-plankton*.

IV. CYSTÆ.**Cysta limbata CL. *)**

Plate VIII. Fig. 15.

By this name I propose to denote an organism, that has already been observed by HENSEN («Welliger Statoblast» 5^{te} Ber. d. Kieler kommission, Pl. IV, fig. 28, 29), but has not got a name. It represents probably a stage in the development of some other organisms, perhaps some dinoflagellate, still, as it is of a certain importance to have a name for it, I propose the above one. It is a cellule of nearly spherical shape, in diameter about 0,05 millim., filled by a granular, probably green, mass. The membrane is somewhat thick and surrounded by a hyaline, plicate girdle, twice as broad as the enclosed cellule. This form is not very rare in the northern Atlantic, the North Sea and the Skagerak.

Hyalosphysa delicatula. N. Sp.

Plate VIII. Fig. 22.

By this name I denote an unknown unicellular alga, which was found in samples from the Azores (August 1898). It is remarkable for the very thin membrane and small scarce chromatophores scattered on the inside of the wall. The form of the cellules is

*) Since the above was written JØRGENSEN (Bergens Museums Aarbog 1899, p. 48) has named this organism *Pterosphæra Möbii*, which name has priority.

slightly cylindrical or almost globular. Diameter 0,08 to 0,08 millim. As I have seen alcohol-preserved specimens only, I am unable to decide whether the chromatophores are green or yellow.

Pyrocystis hamulus. N. Sp.

Plate VII. Fig. 23.

This characteristic cysta, perhaps a stage in the development of some dinoflagellate, seems to be akin to *Pyroc. lunula*. It is remarkable for the small body, that suddenly goes over in two long, towards the distal part bent horns. I have found it in samples from the Indian ocean and in the Atlantic between 12°—32° N., 47°—74° W., in *desmoplankton*.

Xanthidium paucispinosum. N. Sp.

Plate VII. Fig. 24.

This cysta is probably the same as has been figured by HENSEN (5^{te} Ber. d. Kieler kommission, Pl. IV, fig. 31) as »dornige cyste». I have met with it both off the N. coast of South America and at the Azores.

V. DIATOMACEÆ.

Asterionella notata GRUN.

Plate VII. Fig. 32.

GRUNOW has figured a valve and two frustules of this species (Van HEURCK Synopsis, Pl. LII, fig. 3), which I have found in samples from the Azores. The frustules are connected by their basal part to comb-like colonies, which are twisted in different ways. Besides, the frustules in one colony are frequently directed in various directions.

Asteromphalus atlanticus CL. and As. heptactis RLFS.

Plate VIII. Fig. 6—9.

In the year 1873 I published a figure of an *Asteromphalus* (Bih. till Kongl. Sv. Vet.-Akad. Handl., 1, n:o 13, Pl. IV, fig. 19), found in bottom-mud from Davis Strait, which I supposed to be *A. Brookei* Bail. Later, in 1896 (Bih. till Kongl. Sv. Vet.-Akad. Handl., Vol. XXII 3, n:o 4, pag. 5) I proposed to name this form, which occurs in the northern Atlantic, *A. atlanticus*. GRAN (Den Norske Nordhavs Expedition 1876—78. Protophyta 1897, Pl. IV, fig. 63) has given a good figure of the same form. In a recent publication (Iagttagelser over overfladvandets temperatur, saltoldighed og plankton fra Islandske og Grönlandske skibsruter in 1898, pag. 52) OSTENFELD means, that *A. atlanticus* is a small form only of *A. heptactis*. This opinion seems to me to be erroneous,

as will be seen from the figures, Pl. VIII, fig. 6—9. Of these the fig. 6 represents a specimen of *A. heptactis* (23^d of May 1898 58° 48' N., 18° 45' W., OSTENFELD'S collection), the fig. 9 a very small specimen of *A. atlanticus* from the same gathering. The fig. 8 represents a specimen of ordinary size from Davis Strait and the fig. 7 a specimen from the coast of Portugal, the largest I have seen.

The specific difference may be seen from the following comparison:

	<i>A. heptactis.</i>	<i>A. atlanticus.</i>
Size	0,05 to 0,1 millim.	0,025 to 0,05 millim.
Radial proportion of the umbilical space and the limbus	1 : 3.	1 : 2.
Alveoli in 0,01 millim.	6.	12.
Geographical distribution	26° S.—63° N.	46° N.—78° N.
Plankton-type	<i>Styli-plankton.</i>	<i>Cheto- and tricho-plankton.</i>

That *A. heptactis* and *A. atlanticus* are different species cannot be doubted, but the question whether *A. atlanticus* and *A. Brookei* are identical or not, is more difficult to decide without comparison of original specimens. GREVILLE'S figure of *A. Brookei* from Kamtschatka (Trans. Mic. Soc., Vol. VIII, Pl. IV, fig. 18) has 10 alveolate fields, else it seems to agree well, but as the minute structure has not been accurately described, the identification is impossible. It would be of a great interest to settle that question. *)

Chaetoceros difficilis. N. Sp.

Plate VIII. Fig. 16—18.

Chains loose, of quadrate cellules, separate by large rectangular or subhexagonal foramina, half as long as the cellules. Cellules thin-walled, in sagittal-longit. position quadrate with flat valves. Cell-contents (as far as could be ascertained on alcohol-preserved specimens) with only one chromatophore. All awns very delicate. Endocysts in the middle of the cellules, biconvex, smooth, but with a peripheral row of small puncta.

Longitudinal axis 0,005 to 0,008. Sagittal axis 0,008 to 0,01. Endocysts 0,007 to 0,01 millim. Sterile specimens resemble *C. balticus* CL. (Bih. till Kongl. Sv. Vet.-Akad. Handl., Vol. XXI 3, no 5, pag. 25), but the endocysts are different.

This species was found in September 1899 at 59° N., 1° 2' W. (temperature 11,8, salinity 35,37) together with forms that belong to *tripos-* and *sira-plankton*.

Chaetoceros longisetus. N. Sp.

Plate VII. Fig. 25—29.

Chains composed of numerous cellules, straight, thin-walled, without foramina. Cellules in longitudinal-sagittal position quadrate, with flat valves. Awns arising from

*) When this paper was in the press, I received samples from the southern Atlantic, which contained abundantly *A. Hookeri* ELL. This antarctic form agrees perfectly with the boreal *A. atlanticus*, which name consequently must be exchanged for *A. Hookeri*.

the angles, all turned in an angle of 15° — 20° towards the longitudinal axis, thinner and stronger intermingled. Terminal awns very long, stronger than the others, angular, with spirally arranged small spines, which become stronger towards the distal end. Endocysts in the middle of the cellules, biconvex, covered with numerous, long bristles.

Longitudinal axis 0,012 to 0,028. Sagittal axis 0,02 to 0,025. Endocysts 0,009 to 0,012 long. Their sagittal axis 0,02 to 0,025 millim. This species was found in March 1898 at 7° N., 55° W. (Temperature $25,9$.)

This species is well distinguished from all known forms by the absence of foramina, by the direction of the awns by the endocysts and the size. In the absence of foramina and the direction of the awns it reminds of the very small form, which I have named *C. subtilis* (Bih. till. Kongl. Sv. Vet.-Akad. Handl., Vol. XXIII 3, no 5, fig. 8). Another form without foramina I found in plankton from the Caspian Sea.

Chaetoceros Ostenfeldii. N. Sp.

Plate VIII. Fig. 19.

Chains flexible, with large oval foramina, as large as the cellules. Cellules thin-walled, with concave valves, somewhat longer than broad. Awns thread-like, short. Terminal setæ stronger than the others. Cell-contents (as far as could be ascertained on alcohol-preserved specimens) with one chromatophore along the wall of the zone.

Longitudinal axis of the cellules 0,01. Sagittal axis 0,007 millim.

This form has a considerable resemblance to *C. laciniosus* SCHÜTT, but is much more delicate and has a single chromatophore. It has been distinguished by OSTENFELD (lagttagelser over overfladsvandets temperatur, saltholdighed og plankton, in 1898) as »*C. laciniosus* off.»

It was observed in April 1898 abundantly at 49° — 48° N., 19° — 29° W., rarer in the Irminger Sea and the Färøe Channel, but became there common in May. Later it was seen only rarely, but in August it was found abundantly between Iceland and Greenland.

Dactyliosolen hyalinus. N. Sp.

Plate VIII. Fig. 33.

Cellules cylindrical, $1\frac{1}{2}$ to 2 times longer than broad, firmly united into confervoid threads. Valves circular flat, without any visible structure and with simple, not crenulate margins. Zone with numerous transverse rings, 2 in 0,01 millim., not distinctly punctate. Chromatophores small. Length of the cellules 0,06 to 0,08, their diameter 0,04 millim.

This species was found from February to June 1898 in the region of the Newfoundland Banks, associated with species belonging to *styli-plankton*. It reappeared on the same area in November. Temperature $14,4$, mean of 32 obs., max. 20 , min 8 . Salinity 35 , mean of 27 obs., max. $36,49$, min. $32,62$.

Skeletonema tropicum. N. Sp.

Plate VIII. Fig. 30, 31.

This species differs from *S. costatum* in its larger size and numerous, closer peripheral processes. Sagittal axis 0,015 to 0,038, longitudinal axis 0,01 millim. Processes 7 to 9 in 0,01 millim., their length 0,01 to 0,02 millim. I found this species in samples from the coasts of S. America, 29° S. and 6°—10° N. *Temperature* 23,8 to 27,2. *Salinity* from 34,53 to 36,01. Evidently a *tropical neritic* form.

Thalassiosira condensata. N. Sp.

Plate VIII. Fig. 12, 13.

Cellules very thin-walled, short, cylindrical, united by a single central short slim-thread to somewhat rigid chains. Valve orbicular with a central pore and a marginal circlet of close small protuberances, about 7 in 0,01 millim., but else without any visible structure (on ignited specimens). Zone with numerous rings. Chromatophores small and rounded, along the interior wall of the cellule. Length 0,02 to 0,03, diameter 0,025 to 0,03 millim.

The membrane is so little silicious that it, on drying, becomes deformed.

This species was found in October 1899 at Plymouth together with several *arctic* forms.



Plate I.

Fig. 1—7. *Acartia macropus* CL.

- | | | | | |
|---|-------|----------------------------------------------|---|------|
| » | 1. | Outline of the male, dorsal | × | 85. |
| » | 2. | Outline of the female, dorsal | × | 85. |
| » | 3. | Left anterior antenna of the male | × | 170. |
| » | 4. | Right anterior antenna of the male | × | 170. |
| » | 5. | Fifth foot-pair of the male | × | 170. |
| » | 6. | Fifth foot of the female | × | 300. |
| » | 7. | Head of the male, lateral | × | 170. |
| » | 8—11. | <i>Corycaeus longicandis</i> DANA, male. | | |
| » | 8. | Outline, dorsal | × | 85. |
| » | 9. | Outline, lateral | × | 85. |
| | 10. | Abdomen and furca, dorsal | × | 170. |
| » | 11. | Posterior antenna | × | 500. |

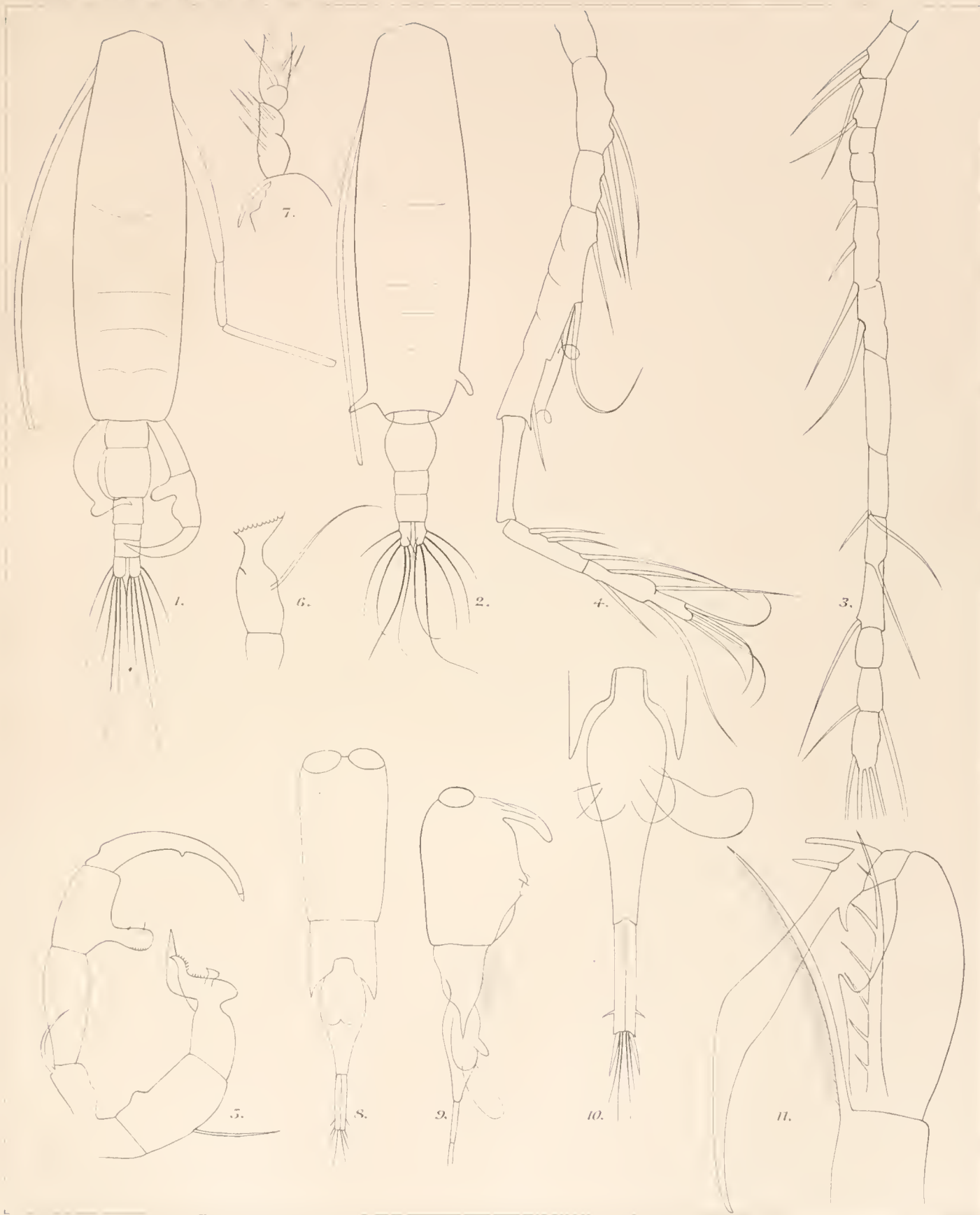


Plate II.

Euchirella rostrata CLAUS.; male.

Fig.	1.	Outline, lateral	×	40.
»	2.	Fifth foot-pair	×	85.
»	3.	The same from a young specimen	×	85.
»	4.	Abdomen, dorsal	×	85.
»	5.	Mandible	×	170.
»	6.	Second maxillipede	×	170.
»	7.	Posterior antenna	×	170.
»	8.	First foot	×	170.
»	9.	Second foot	×	170.
»	10.	Third foot	×	170.
»	11.	Fourth foot, <i>B. 1</i> and <i>B. 2</i> , <i>Ri.</i>	×	170.
»	12.	End of the left first antenna	×	85.

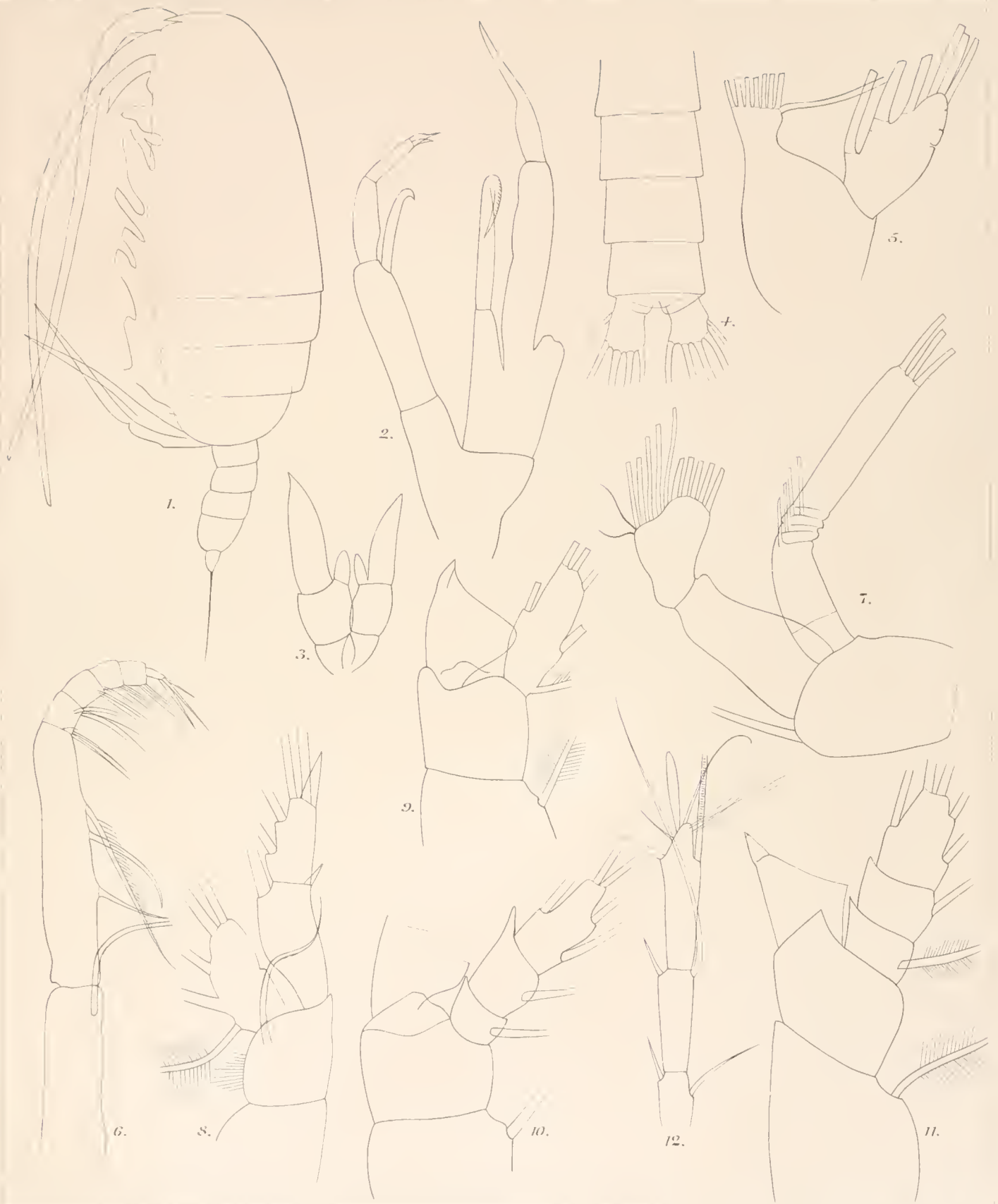


Plate III.

Fig. 1—11. *Oncaea subtilis* GIESBR. Male.

»	1.	Outline, dorsal	× 170.
»	2.	Outline, lateral	× 170.
»	3.	Left anterior antenna	× 500.
»	4.	Right anterior antenna	× 500.
»	5.	Abdomen and furca, dorsal	× 300.
»	6.	Furca, dorsal	× 500.
»	7.	Abdomen and furca, lateral	× 300.
»	8.	Posterior maxillipede	× 500.
»	9.	Posterior antenna	× 500.
»	10.	Second foot	× 500.
»	11.	Fourth foot	× 500.
»	12.	<i>Anthocyrtium anthemis</i> HKL.?	× 500.
»	13.	<i>Sethoconus crinitus</i> CL.	× 500.
»	14, 15.	<i>Challengeron brevispina</i> CL.	× 500.
»	16.	<i>Euphysetta pusilla</i> CL.	× 500.
»	17.	<i>Spermatogonia antiqua</i> LEUD. FORTM.	× 500.
»	18.	<i>Sperm. ant.</i> central capsule(?), treated with soda	× 500.



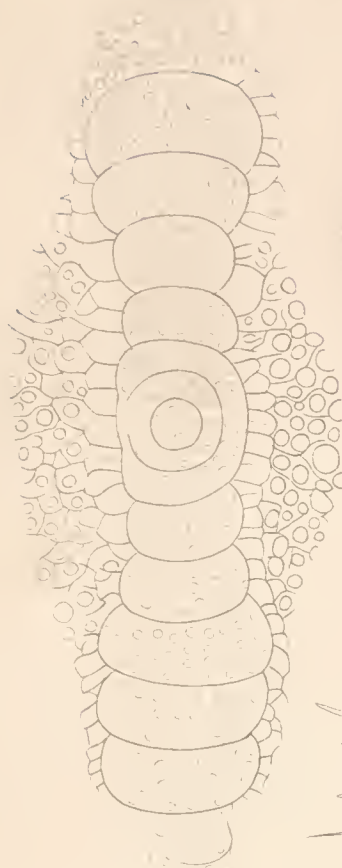
Plate IV.

Fig.	1.	<i>Quadrilonche crux</i> CL.	. . . . .	× 500.
»	2, 3.	<i>Lampromitra erosa</i> CL.	. . . . .	× 500.
»	4.	<i>Psilomelissa longispina</i> CL.	. . . . .	× 500.
»	5.	<i>Dictyoceras neglectum</i> CL.	. . . . .	× 500.
»	6.	<i>Sethocyrtis pyrum</i> CL.	. . . . .	× 500.
»	7.	<i>Theocyrtis turris</i> CL.	. . . . .	× 500.
»	8.	<i>Theoconus junonis</i> HKL. affin.	. . . . .	× 500.
»	9.	<i>Clathrocanium minutum</i> CL.	. . . . .	× 500.
»	10.	<i>Dictyocephalus cylindricus</i> CL.	. . . . .	× 500.
»	11.	<i>Theocyrtis aculeata</i> CL.	. . . . .	× 500.

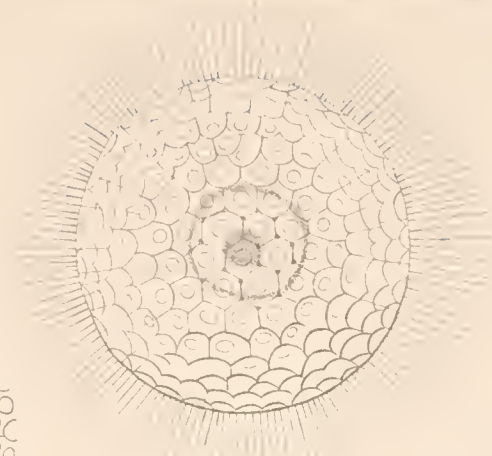


Plate V.

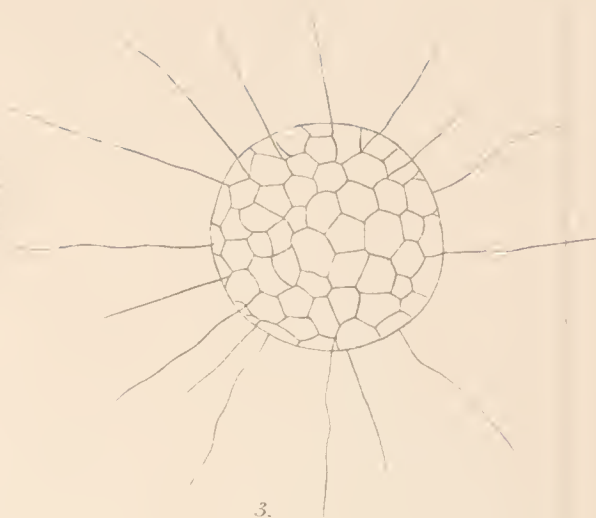
- Fig. 1. *Amphihymenium elegans* CL. × 500.
 » 2. *Actinomma(?) sol.* CL. × 500.
 » 3. *Actinosphæra trichophora* CL. × 500.
 » 4. *Halionmma irregulare* CL. × 300.
 » 5. *Halionmma echinosphæra* CL. × 500.
 » 6. *Hexacontium setosum* HKL.? × 500.
 » 7. *Halionmma spinulosum*, with two exterior shells × 300.



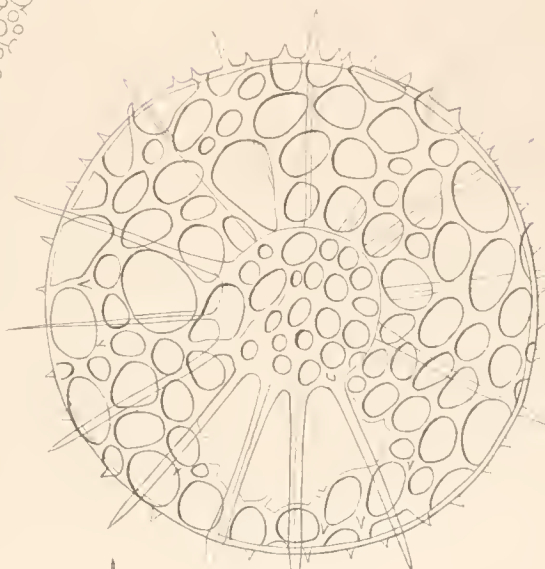
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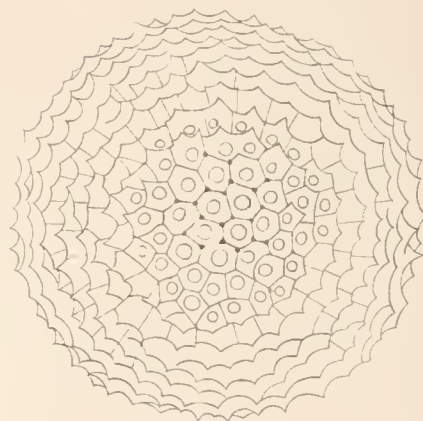
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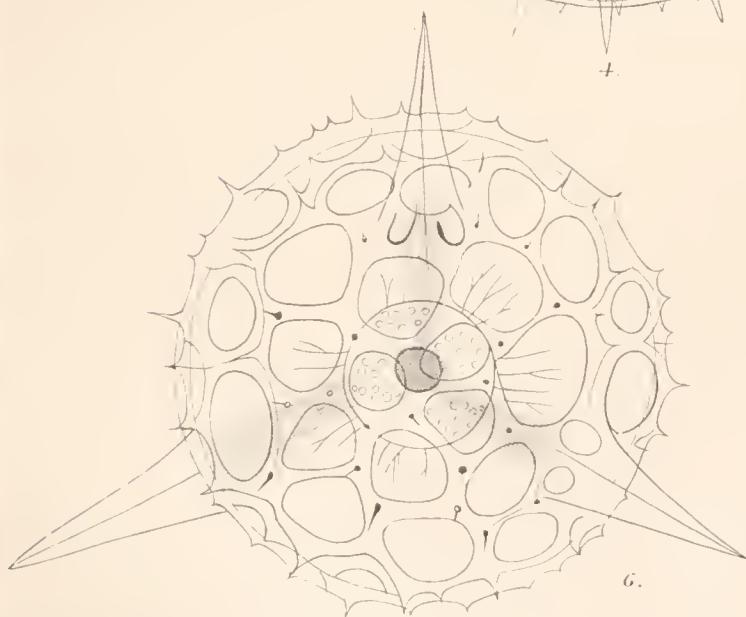
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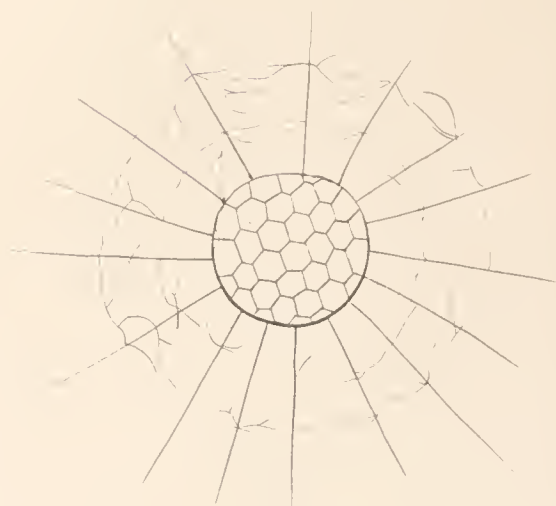
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5.



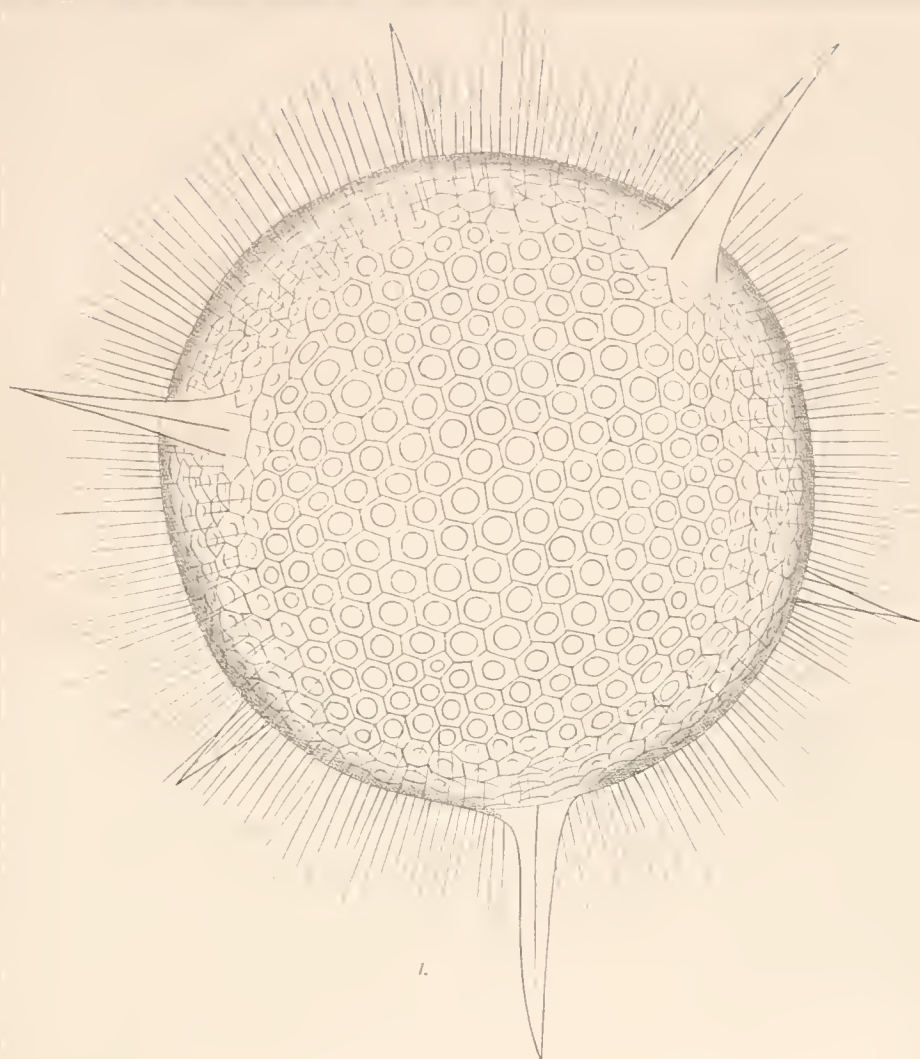
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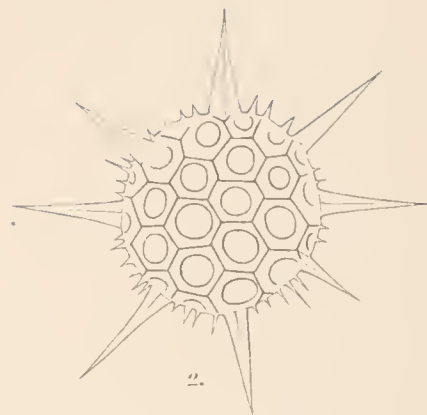
7.

Plate VI.

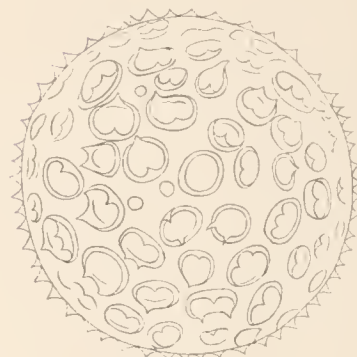
- Fig. 1. *Hexastylus nobilis* CL. × 500.
 » 2. *Heliosphæra minuta* CL. × 500.
 » 3. *Trypanosphæra brachysiphon* CL. × 300.
 » 4. *Hexacontium hostile* CL. × 500.
 » 5. *Hexacontium armatum* CL. × 500.



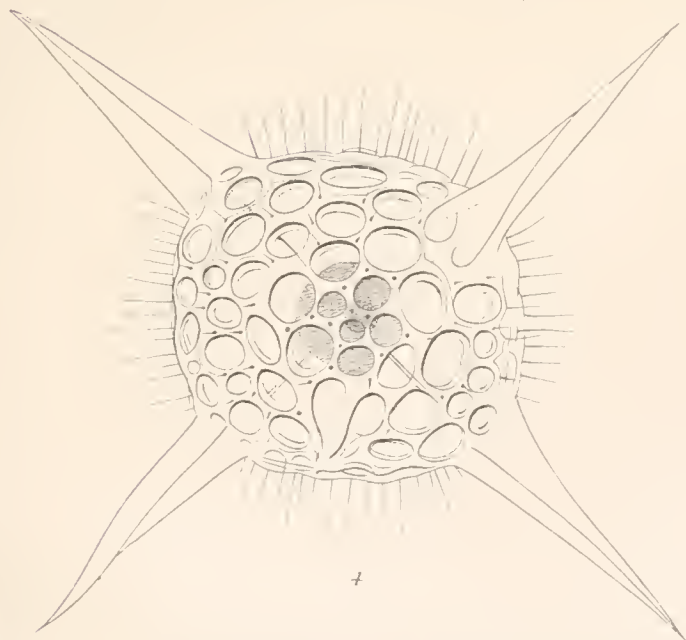
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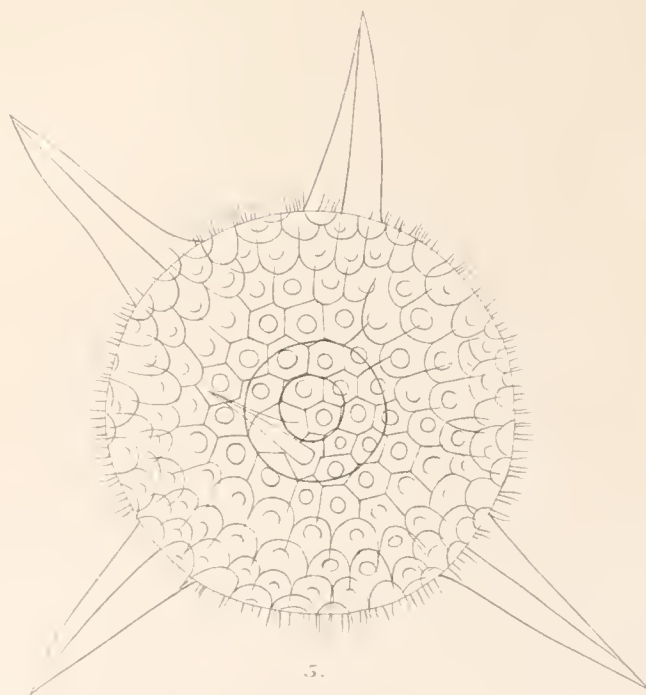
2.



3.



4.



5.

Plate VII.

Fig.	1.	<i>Ceratium ranipes</i> CL.	×	250.
	2.	<i>C. curvicone</i> V. DADAY	×	250.
	3.	<i>C. (tripos var.?) arietinum</i> CL.	×	250.
"	4.	<i>C. (tripos var.?) volans</i> CL.	×	250.
»	5.	<i>C. (tripos var.?) vultur</i> CL.	×	250.
—	6, 7.	<i>C. (tripos var.?) azoricum</i> CL.	×	250.
—	8, 9.	<i>C. reflexum</i> CL.	×	250.
»	10.	<i>C. contortum</i> GOURRET	×	250.
	11.	<i>C. (tripos var.?) arcuatum</i> GOURRET	×	250.
	12.	<i>C. (tripos var.?) flagelliferum</i> CL.	×	250.
	13.	<i>C. belone</i> CL.	×	250.
	14.	<i>C. paradoxides</i> CL.	×	250.
	15, 16.	<i>Peridinium elegans</i> CL.	×	250.
	17, 18.	<i>P. oceanicum</i> VANHÖFFEN	×	250.
»	19, 20.	<i>P. diabolus</i> CL.	×	250.
—	21, 22.	<i>P. pallidum</i> OSTENF.	×	250.
—	23.	<i>Pyrocystis hamulus</i> CL.	×	250.
—	24.	<i>Xanthidium paucispinosum</i> CL.	×	150.
	25.	<i>Chetoceros longisetus</i> CL., sterile chain	×	500.
	26, 27.	<i>C. longisetus</i> CL.; with endocysts	×	500.
	28, 29.	<i>C. longisetus</i> CL.; terminal setæ	×	1000.
	30, 31.	<i>Skeletonema tropicum</i> CL.	×	500.
	32.	<i>Asterionella notata</i> GRUN	×	250.
	33.	<i>Dactyliosolen hyalinus</i> CL.	×	250.

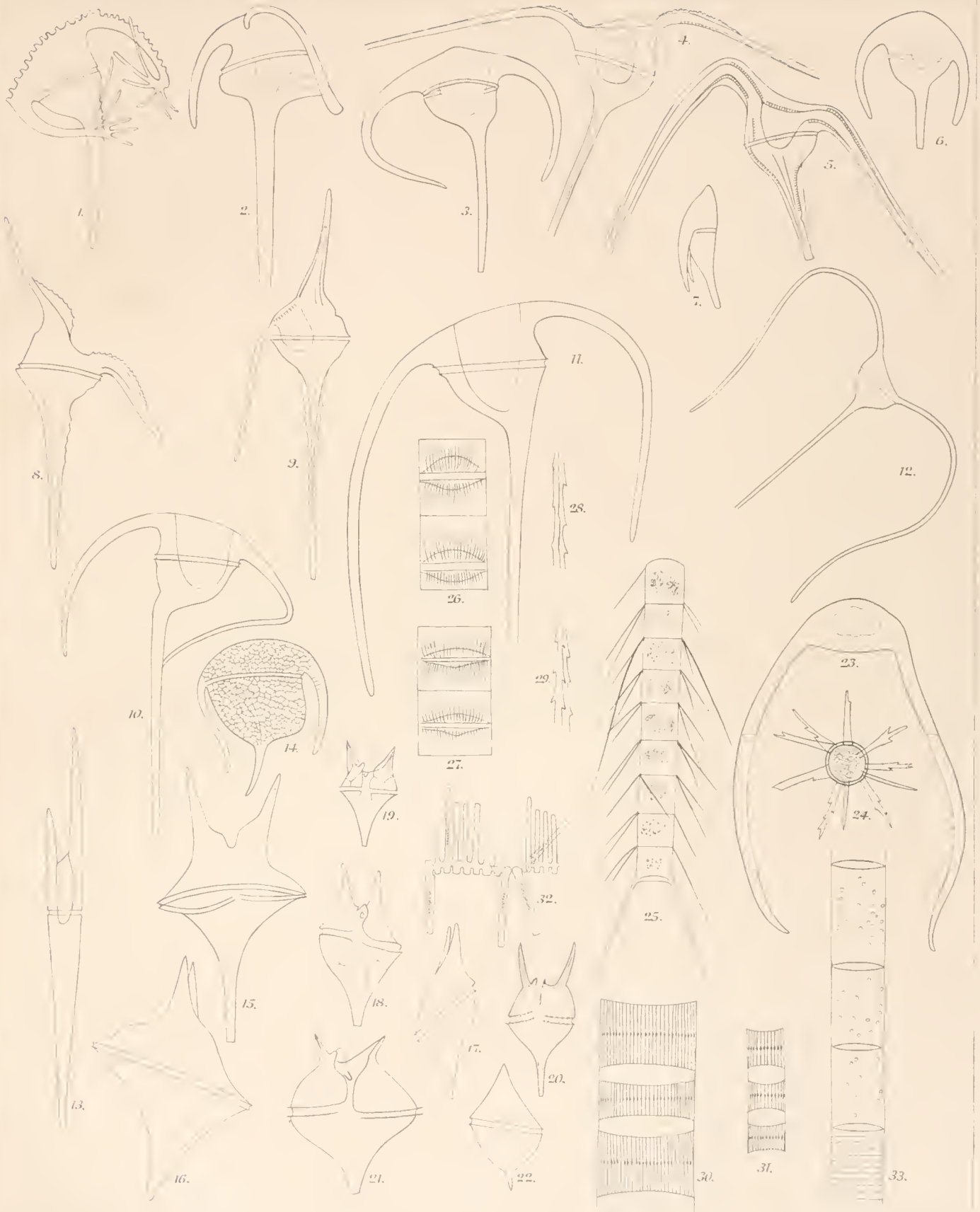


Plate VIII.

Fig.	1, 2.	<i>Hyalophysa delicatula</i> CL.	×	500.
	3.	<i>Dinophysis Vauhoffenii</i> OSTENF.	×	500.
	4.	<i>Steiniella(?) punctata</i> CL.	×	500.
	5.	<i>Peridinium exiguum</i> CL.	×	500.
	6.	<i>Asteromphalus heptactis</i> RALFS.	×	1000.
	7.	<i>A. atlanticus</i> CL. from Portugal	×	1000.
	8, 9.	<i>A. atlanticus</i> CL. from N. Atlantic	×	1000.
	10, 11.	<i>Phalacroma minutum</i> CL.	×	500.
	12.	<i>Thalassiosira condensata</i> CL.; a chain	×	500.
	13.	<i>Th. condensata</i> CL.; a valve, ignited	×	1000.
	14.	<i>Ceratium(?) hyperboreum</i> CL.	×	500.
	15.	<i>Pterosphæra Möbii</i> JØRGENSEN	×	500.
	16.	<i>Chaetoceros difficilis</i> CL., sterile chain	×	1000.
	17.	The same, with endocysts	×	1000.
	18.	The same, endocysts, from above and from the side	×	1000.
	19.	<i>Chaetoceros Ostenfeldii</i> CL.	×	1000.

